NORWAY'S NATIONAL REPORT ON IMPLEMENTATION OF THE CONVENTION ON BIOLOGICAL DIVERSITY

INTRODUCTION

The conservation of biological diversity has a long tradition in Norway, and is linked with nature conservation, natural resource management, the prevention of pollution, land use management and the utilization of biological resources for commercial purposes in the primary industries. Since Norway ratified the Convention on biological diversity on 9 July 1993, we have given high priority to the implementation of the Convention at both national and international level. The Convention stresses that consideration of biological diversity must be integrated into all relevant sectors. In Report No. 13 (1992-93) to the Storting concerning the UN Conference on Environment and Development, the Government stated that all sectors involved in the management of biological diversity or that have an impact on it would be required to draw up strategies and action plans for the conservation of biological diversity. In accordance with this, the Ministry of Fisheries, the Ministry of Defence, the Ministry of Education, Research and Church Affairs, the Ministry of Agriculture, the Ministry of the Environment, the former Ministry of Industry and Energy, and the Ministry of Transport and Communications have all drafted sectoral plans. These describe the impact of activities within the sphere of responsibility of each ministry on biological diversity, and include goals, instruments and measures for the sector. The drafts were completed in summer 1994, and were then forwarded to about 400 organizations and public agencies for comment.

Work on an overall national action plan for biological diversity was shelved to allow Report No. 58 (1996-97) to the Storting on an environmental policy for sustainable development to be drawn up. This drew on experience of the sectoral plans and plans drawn up by seven municipalities, and presents the Government's goals, strategy and areas of priority for the conservation and sustainable use of biological diversity. This National Report reviews the main elements of implementation of the Convention in Norway as they are presented in the Report to the Storting. It is a product of interministerial cooperation and is based on contributions from all the sectors involved.

NORWAY'S POSITION IN RELATION TO THE GLOBAL CHALLENGES

As stated in Proposition No. 56 (1992-93) to the Storting on approval of ratification of the Convention, the Norwegian Government gives very high priority to international cooperation in responding to the issues that come within the scope of the Convention. Since we signed the Convention at the UN Conference on Environment and Development in Rio in 1992, Norway has attached great importance to its participation in international efforts to strengthen the Convention both in scientific terms and as regards the mechanisms for its implementation. In recognition of the fact that the major challenges related to conservation of global biological diversity are associated with the tropical rain forests, Norway has made it one of its priorities to assist developing countries to participate in meetings under the convention. These include meetings of the Conference of the Parties (COP) and the Subsidiary Body for Scientific, Technical and Technological Advice (SBSTTA), negotiations on a protocol on the safe transfer, handling and use of living modified organisms (biosafety protocol) and other relevant meetings. Norway has also acted as host country for three scientific conferences under the Convention on biological diversity:
the 1993 Trondheim Conference on biological diversity
the 1996 Trondheim Conference on Alien Species

the 1997 Workshop for selected developing and Eastern European countries on biological diversity in inland waters

430 representatives of 87 countries took part in these conferences, and Norway provided support for a number of participants. Norway has also provided bilateral and multilateral support for developing countries through NORAD. Since 1992, Norway has contributed about NOK 220 million to the Global Environmental Facility (GEF), which is the financial mechanism for the Convention. Norway is part of the biogeographical region of Europe, and has since 1994 played an active part in the development of the pan-European biological diversity and landscape strategy for implementation of the Convention. This work is being followed up by the Council of Europe and UNEP's regional office in Geneva, with operative assistance from the IUCN. In this connection, Norway has entered into cooperation with Latvia and provided support for the preparation of its national status report on biological diversity.

Norway has attended all the meetings of the Conference of the Parties to the Convention (COP). Its delegation has been headed at political level and has had members drawn from a variety of fields to ensure that cross-sectoral responsibility for these issues is implemented in practice. In Norway's view, the COP meetings have resulted in good progress in developing and strengthening the Convention; in particular, work on protocols and work programmes under the convention has in our opinion has been very important in strengthening its implementation in areas of great significance. Since the meeting of the COP, we have given priority to our contribution to a sound scientific basis for work within the framework of the Convention on biological diversity. In addition to the conferences and workshop mentioned above, Norway has through active participation and leading positions in the SBSTTA provided assistance during the first phase of developing a scientific foundation and the mechanisms on which the Convention on biological diversity is to base its further work.

A number of the challenges related to safeguarding valuable biological diversity and reducing losses of biological diversity are of supranational character and therefore require binding international cooperation. The Government considers it very important to further develop the Convention on biological diversity and other relevant global and regional agreements and to take practical steps for their implementation (cf box 1).

Box 1 The Government will:

- be actively involved in further development of the Convention on biological diversity, e.g. by following up decisions on marine and agricultural biological diversity and issues relating to indigenous people
- follow up the Trondheim conferences to promote the implementation of the Convention on biological diversity
- participate in negotiating a biosafety protocol under the Convention by the end of 1988
- provide financial support, through bilateral and multilateral sources of funding, to cooperation partners in the Third World and Eastern Europe for their efforts to achieve the objectives of the Convention on biological diversity at national level, both as regards conservation and sustainable use of biological diversity and as regards fair and equitable sharing of the benefits arising out of the utilization of genetic resources
- take an active approach to the integration of consideration of biological diversity into other international processes, thus confirming the unifying global role of the Convention on biological diversity

- help to make global work concerning biological diversity more effective, for instance by coordinating any relevant regional and global conventions within the framework of the Convention on biological diversity
- seek to ensure that patents and other intellectual property rights to genetic resources and inventions in the field of biotechnology support the objectives of the Convention on biological diversity and do not work against them.

MAIN NATIONAL CHALLENGES

GOALS AND STRATEGIES

In Norway, as in the rest of the world, biological diversity is being reduced or lost. The Government therefore attaches great importance to implementation of the Convention at national level, both to contribute to conservation of biological diversity and to help to develop strategies and plans in accordance with the Convention.

Box 2 The Government will:

- ensure that consideration of biological diversity is incorporated into municipal and county plans pursuant to the Planning and Building Act, as set out in Report No. 29 (1996-97) to the Storting on regional planning and land use policy. The elaboration of separate national policy guidelines for biological diversity will be considered.
- make the relevant planning processes more predictable by improving the information available to decision-makers at all levels and in all sectors. This will be done through a five-year nationwide programme involving the central and local authorities, which will develop methods of surveying, valuing and monitoring biological diversity and establish a national monitoring programme (cf p. 9)
- consider whether to commission a study on the introduction of a land use tax, and review all expenditure items in the state budget with the aim of removing any subsidies that have an adverse effect on biological diversity
- draw up operational goals and indicators for biological diversity in connection with the preparation of sectoral environmental action plans for all relevant fields
- draw up an overall national action plan which elaborates Norway's strategy for implementing the Convention and puts in concrete terms. The sectoral environmental action plans will form part of the national plan (cf p.6)
- strengthen research, education and information concerning biological diversity and its linkages with society as a whole.
- Consider amendments to the Nature Conservation Act to strengthen the protection of biological diversity.
- Seek to make the forestry industry more sustainable through a broad-based review of forestry policy instruments
- Make arrangements to facilitate sustainable development of the agricultural sector, including development and maintenance of the cultural landscape and reduction of the adverse environmental effects of the sector
- Ensure that the fisheries and fish farming industries take steps to conserve the natural resource base and to minimize adverse effects on wild species and the marine environment.

Norway has a long tradition of efforts to ensure the conservation and sustainable use of biological diversity because fishing, hunting, whaling and sealing have always played such an important role here, and because farming techniques and harvesting from outlying areas have been adapted to severe climatic conditions over the years.

The parties to the Convention on biological diversity have undertaken to develop national strategies, plans and programmes for the conservation and sustainable use of biological diversity and to integrate these considerations into activities in all relevant sectors. The Norwegian Government gives national implementation of the Convention high priority. The following describes the action being taken to achieve this on the basis of the Government's overriding objective, which is to conserve biological diversity and ensure its continued evolution.

The Government's goal is to ensure that the values deriving from the interplay between human society and biological diversity benefit the community as a whole, and that the costs of implementing special measures in this connection are equitably shared.

Box 3 The Government will take steps to safeguard:

- a representative selection of all types of habitats and to maintain intact the last remaining continuous areas of natural habitat.
- the greatest possible biological diversity in cultural landscapes. This includes the maintenance of viable populations of all known and naturally occurring species of vertebrates, higher plants and endemic species.
- a wide and representative selection of species belonging to various groups of invertebrates, lower plants (lichens, mosses and algae), fungi and microorganisms, focusing on species of socio-economic or ecological importance.
- genetic variation within and between populations of endangered and vulnerable species, species that can be harvested and domesticated species.

The goals set out in box 3 are in accordance with the objectives of the most important acts relating to nature management in Norway and reflect a systematic approach to safeguarding the values assigned to biological diversity.

In accordance with its obligations under the Convention on biological diversity, the Government will use the following *strategy* to achieve its goals:

- *further loss of biological diversity is to be limited* by focusing on its causes. Loss of biological diversity is caused by a wide range of factors that influence the environment, such as land use, alteration of the physical environment, over-exploitation, pollution and the introduction of alien species. Even though a single factor may have little effect, the total pressure on the environment may reach a critical level. The most important causes of loss of biological diversity may vary from ecosystem to ecosystem, but the underlying causes of such loss are to be addressed wherever relevant and possible.

- *biological diversity shall be used sustainably.* The Government considers it very important that the various industries ensure that their use of biological resources is ecologically sustainable in the long term. It is particularly important to ensure that agriculture, forestry and fisheries are sustainable. The goods and services provided by these industries must be obtained without having a negative impact on ecological functions related to, for instance, productivity and nutrient cycles, or on our opportunities to benefit from the passive values associated with biological diversity.
- *endangered and vulnerable components of biological diversity shall be protected and in special cases, restored if possible.* The Government gives high priority to continuing and reinforcing environmental protection measures. It is particularly important to protect endangered and vulnerable habitats and the cultural landscape. Endangered species and populations also require special protection. In certain cases, it may be appropriate to take remedial action, for example liming acid rivers and lakes to counteract the effects of long-range air pollution, or to implement precautionary measures such as the establishment of gene banks to preserve endangered species, populations or genetic diversity.

This strategy requires the active participation of all sectors involved through the use of their own policy instruments. It also means that relevant information on biological diversity must be available to planners and decision-makers. The Government will raise levels of knowledge about biological diversity through monitoring, surveys, research and education. It is particularly important to ensure that all sectors and local authorities have access to adequate data on biological diversity. This must include information on where important components of biological diversity are to be found and identification of its ecological value and of factors that have an impact on the environment, drivers of change and what policy instruments are available.

INTER-MINISTERIAL COOPERATION

The Government will use a combination of administrative and economic environmental policy instruments to ensure that the overall use of such instruments is as efficient and cost-effective as possible. The wide variation in the underlying causes of pressure on biological diversity means that, as required by the Convention, we must pursue a cross-sectoral policy and also integrate environmental considerations into the policy framework for all sectors of society. If this can be done at an early stage in the planning process, it will be possible to take a more preventive approach to environmental problems. This is important in the management of biological diversity, since it is often impossible to find measures that are adequate to alleviate the effects of environmental disturbance after the event. To put the precautionary principle into practice, the Government has for the past 10 years been working systematically to develop stronger cross-sectoral frameworks, responsibilities and obligations.

Each year since the end of the 1980s, the Government has drawn up a cross-sectoral environmental budget together with the ordinary state budget. In this, each ministry sets out its contribution to environmental protection. To ensure that the requirements for a real contribution are further developed and tightened up, a review of all expenditure in the state budget is planned with a view to eliminating subsidies and financial arrangements that have a negative impact on biological diversity.

During the same period, most of the legislation concerning natural resource management has also been revised to incorporate and specify responsibilities for environmental protection. Furthermore, as a step towards sustainable development, the Government will appoint a

committee to review Norwegian legislation and identify any elements that may hinder the conservation of biological diversity or that do not set out strict enough requirements for conservation of biological diversity. This is also a step in the implementation of a new article of the Norwegian Constitution, which includes the provision that every person has a right to an environment whose productivity and diversity are preserved, and that this right should be safeguarded for future generations.

The environmental authorities have been given the overall responsibility for coordinating the Government's efforts to define national and sectoral environmental policy goals. They are also responsible for monitoring the state of the environment and for cooperating with the various sectors on a result monitoring system. The Storting (Norwegian parliament) receives information on the state of the environment each year through the environmental profile set out by the Government in the state budget.

In 1994, the Ministry of Fisheries, the Ministry of Agriculture, the Ministry of Education, Research and Church Affairs, the Ministry of the Environment, the Ministry of Trade and Industry, the Ministry of Petroleum and Energy and the Ministry of Transport and Communications drew up sectoral action plans for the conservation of biological diversity. Several municipalities have also drawn up action plans in cooperation with the environmental authorities. Using the various plans as a basis, the Government now intends to draw up an overall national action plan reflecting the measures set out in the Convention on biological diversity. The Ministry of the Environment will coordinate this work for the Government.

BIOLOGICAL DIVERSITY IN NORWAY

Improving our knowledge of biological diversity

Once the new national park plan has been implemented in 2008, about 13 per cent of the total area of Norway will be protected under the terms of the Nature Conservation Act. However, the way the remaining 87 per cent is used will in practice be crucial for the conservation and sustainable use of biological diversity. Much the same is true of species management; human activities in general will have a greater impact on the extent to which we succeed in preserving species, population and genetic diversity than the specific conservation and regulatory measures available to the environmental authorities in wildlife and fisheries legislation. It is therefore particularly important to ensure that cross-sectoral cooperation is put into practice in accordance with the Government's goals.

Currently, much data compilation of relevance to biological diversity is being carried out in connection with general nature management and surveys, within monitoring and research programmes and by nature conservation and environmental NGOs. However, a great deal of information is scattered among the various sectors and at different administrative levels, and is therefore not readily available to decision-makers.

The single most important task we face is to procure a sound scientific basis for decision-making and generally available information systems that make use of knowledge, data and continuous monitoring to devise coherent, purposeful and effective arrangements for the management of biological diversity. The Government will therefore organize a five-year nationwide programme involving the central and local authorities to provide a better basis for decisions concerning management of biological diversity at local, regional and national levels

and in all sectors. The programme will also make it possible to clarify responsibilities as regards biological diversity at the various levels.

The programme will start in 1998 and is divided into the following phases:

Phase 1: identification of gaps in our knowledge at national, regional and local level, and of the information currently available. Existing information will be used as far as possible. Phase 1 will requires cooperation between the local and central government administration, and between the environmental, agricultural and fisheries authorities.

Phase 2: Surveying biological diversity and identifying and classifying its value. According to plan, each municipality will have completed this work by the end of 2003. The results will be used as a basis for municipal land-use plans and other management tools as they become available. The survey is to cover the whole area of the municipality, including the coastal zone if relevant.

Phase 3: establishment of a national monitoring programme for biological diversity. A committee including scientists and administrators has submitted a proposed strategy for monitoring of biological diversity in Norway (DN report 1995-7 Strategy for monitoring of biological diversity) of its central recommendations have already been followed up with the elaboration of a proposal for monitoring biological diversity in eight different ecosystems (DN commissioned report 1997-7). This will be used as part of the basis for a report containing a national programme for biological diversity monitoring, which is to be drawn up in 1998. The programme will be designed to provide information on the state of the natural environment and on changes in biological diversity, provide sufficient knowledge to evaluate measures that should be implemented to prevent loss of biological diversity, to evaluate and provide information on measures that are implemented, and to ensure that information on trends in biological diversity are available to all relevant users. The programme will be partly based on already existing monitoring programmes (see references to the monitoring programmes of the various sectors).

Monitoring systems will be specially adapted to the following ecosystems: forest, mires and wetlands, cultural landscapes, mountains, inland waters, marine and coastal areas, and arctic areas. They will focus on rare and threatened habitats and on representative habitats. Monitoring at species and population level will focus on endangered and vulnerable species, species which have key ecological functions and species that are important as indicators of the overall state of ecosystems.

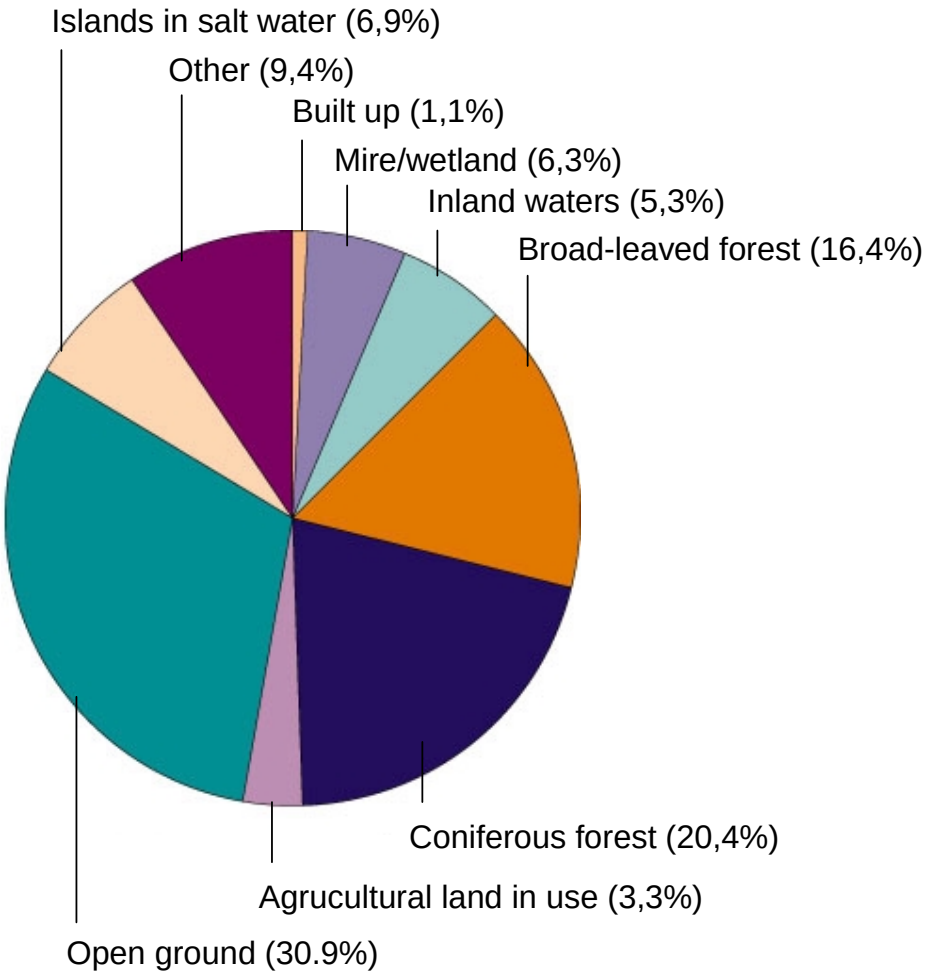
According to plan, the monitoring programme is to be developed during a five-year period. The information it provides is to be available for use by all relevant sectors, and the Government expects the sectoral authorities to set aside funds for the implementation phase.

Biological diversity in Norway: status report

Norway still has relatively large areas of almost untouched wilderness, rich biological resources and thriving populations of most species that are naturally found in the country. However, despite extensive conservation measures and positive developments in certain areas, there have been serious losses of various types of ecosystems during the last fifty years. These include large continuous areas of natural habitat, untouched highly productive coniferous

forest, mires and wetlands, swamp forests, cultural landscapes, untouched river ecosystems and coastal habitats. Figure 1 shows the distribution of ecosystem types in mainland Norway. It is estimated that in total, about 40 000 species occur in Norway. According to the Norwegian Red List, about 45 species are known to have become extinct in Norway in the last 50 years, and almost 500 species are considered to be endangered or vulnerable (*DN report 1992-6*). A revised Red List will be published in 1998.

Figure 1. Distribution of ecosystems in Norway. Percentages of total area of mainland Norway. Sources: Norwegian Mapping Authority, Statistics Norway and Norwegian Institute for Land Inventory

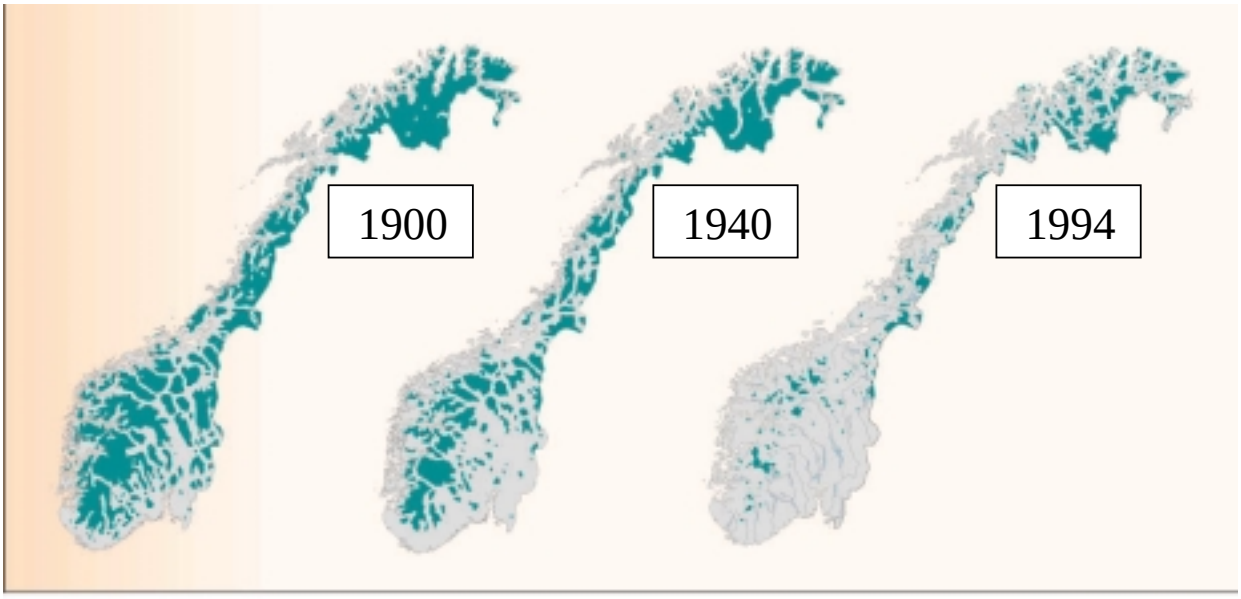


At present, about 6.4 per cent of mainland Norway is protected, but different types of habitats are unevenly represented. The five largest national parks account for 45 per cent of the total protected area, and 90 per cent of this is mountain areas above the tree-line. The purpose of protecting an area is to maintain natural conditions and trends as far as possible or to maintain traditional use of the area. Protected areas include national parks, protected landscapes and

nature reserves. Once the new national park plan has been implemented, about 13 per cent of the area of Norway excluding Svalbard will be protected.

Even though only about 1 per cent of Norway is built-up and about 3 per cent is agricultural land in use, the proportion of wilderness-like areas (more than 5 km from major infrastructure development) has decreased from 48 per cent of Norway's total area in 1900 to 12 per cent in 1994 (cf. Fig. 2). In southern Norway, such areas now account for only 5 per cent of the total, and they have been disappearing considerably faster during the past 15 years than earlier this century with developments such as forestry tracks, power lines, hydropower development, building of holiday cabins, etc.

Figure 2 Remaining areas of wilderness-like habitat in Norway (more than 5 km from major infrastructure development) in 1900, 1940 and 1 January 1994. Sources: GRID - Arendal, Norwegian Mapping Authority. Adapted by the Directorate for Nature Management



Agricultural landscapes

Norwegian agricultural landscapes are defined as all agricultural land including ecotones and natural elements such as dams, streams and wetlands, farm buildings and cultural relics. Habitats of special interest in this context are areas of agricultural land that have been managed by traditional farming practices, such as natural pastures, species-rich meadows, semi-natural meadows, summer farmland and coastal heaths. After 1945, intensification has led to a more uniform agricultural landscape, which is less mosaic-like and has fewer ecotones. Together with the growing use of chemical products, this has reduced biological diversity. Hay meadows have largely been abandoned, and many pastures have become overgrown. In 1959, semi-natural hay meadows accounted for more than 10 per cent of the total agricultural area. By 1989, this had dropped to less than 5 per cent in large parts of the country and to less 0.5 per cent in certain areas.

However, topographical, geographical and historical factors have limited the development of agriculture in Norway, and the percentage of agricultural land is very low. Continuous areas of farmland are small, and the average farm is only about 10 hectares in size. Grass for pasture and fodder is the most important crop on 55 per cent of the total area, 35 per cent is under cereals, and the remainder is used to grow various fodder crops, potatoes and vegetables. Dairy farming is important, but herd sizes are relatively small. Cereal production is concentrated in the best arable areas in south and central Norway, and livestock production based on coarse fodder is the dominant type of farming in the north and west.

The expansion of towns and built-up areas has taken place to a large extent on valuable agricultural land and other cultural landscapes and on green spaces within built-up areas. It is estimated that about 75 000 ha of agricultural land has been lost in this way since 1945, of which about 40 000 ha has been lost since 1970. Only 20-30 per cent of the green spaces that existed in towns and built-up areas in the 1950s still remain today.

A cautious estimate of the numbers of endangered, vulnerable and rare species of animals and plants in the cultural landscape indicates that about 300 species are endangered or vulnerable, while at least 600 species should be given special consideration because we know too little about their status. About 3 per cent of Norwegian plant species and about 10 per cent of Norwegian bird species are considered to be endangered by developments in the agricultural landscape (Solheim 1989).

Forest

Norwegian forests are part of the boreal coniferous forest belt around the northern hemisphere. As a result of the wide variations in climate and growing conditions from north to south in the country and from sea level to the mountains, Norway's forests include many different communities. These are mainly broad-leaved and coniferous woodlands. Several types of forest are found nowhere else in Europe.

About 37 per cent of the total area of Norway excluding Svalbard is forested. About half of this is used for commercial forestry. About half of the estimated 40 000 species of plants and animals found in Norway are associated with forest, and forest ecosystems are therefore important for the conservation of biological diversity. Current knowledge also indicates that about half the 1 839 species on the Norwegian list of endangered and rare species are associated with forest.

There has been substantial commercial utilization of forest resources in Norway for several hundred years. In certain periods, the yearly harvest was far greater than the annual increment and the volumes harvested today. A hundred years ago, Norwegian forests were severely depleted. An active and purposeful forest policy has resulted in the restoration of forest areas, and both the extent of such areas and their productivity have increased substantially in the last 60 to 70 years. Long-range transport of pollutants (for example as acid rain), irreversible developments in forested areas, the construction of power lines, and to some extent hydroelectric developments have however led to the reduction of the area of forest in certain parts of the country during this period. The area of virgin forest has been reduced to less than 0.5 per cent of the total forested area of the country. About 68 areas of forest larger than 10 km^2 without infrastructure development have been registered. Fifty alien tree species have been planted, but only a few species are used commercially, the most important being sitka

spruce (*Picea sitchensis*) and lodge pole pine (*Pinus contorta*). Surveys of the distribution of such species and of any effects on broad-leaved species are currently being conducted.

Inland waters

In Europe, untouched rivers and intact river ecosystems are now almost entirely restricted to the remnants still to be found in the Nordic countries and northern Russia. The greatest range in biological diversity, sizes and types of river systems is to be found in Norway. Norwegian river systems include 440 000 lakes larger than 500 m^2, nine of the world's 20 highest waterfalls, two of which are not regulated, and the four deepest lakes in Europe, two of which are not regulated. Stocks of anadromous salmonids have been registered in 1222 rivers in Norway. Of these, 669 are salmon rivers. Sea trout is the most widespread of these species, and is found in 1185 of the rivers. Sea char occurs in 147 rivers. Norway and Iceland have the largest remaining numbers of wild salmon stocks in Europe, but many of these are in a precarious situation. Norway is the only country in the world where Atlantic salmon, sea char and sea trout occur in the same river system.

The rich river ecosystems have made it possible for a wide range of bird species to establish thriving populations. Between 60 and 70 of Norway's 250 breeding species of birds are associated to some extent with inland waters. Of these, 25 species are considered to be endangered.

Long-range transport of pollutants in the form of acid rain is the single factor that has had most impact on biological diversity in inland waters. About 2 500 fish stocks in southern Norway have been lost. Current rates of sulphur and nitrogen deposition result in critical loads for acidification being exceeded across 25 per cent of the area of Norway. Since 1988, the sulphur content of precipitation, rivers and lakes in southern Norway has dropped by about 35 per cent, and certain species of aquatic invertebrates are now recovering. However, inputs of nitrogen have not been reduced.

Mires and wetlands

Mires account for a large proportion of wetland areas, and in all, cover almost 10 per cent of Norway's total land area. About two-thirds of this lies below the tree-line. Compared with most other countries, Norway has a very wide range of mire types, from extremely nutrient-poor to extremely nutrient-rich.

River deltas are an example of a heavily-exploited type of habitat along the coast. They have for instance been used for industry, housing, roads and agriculture. In Western and Central Norway, 86 per cent of the total area of land formerly covered by 15 river deltas has been used for infrastructure development or agriculture.

Mires, forested mires and swamp forests account for 16.4 per cent of forested areas under the coniferous timber line. Drainage has reduced the areas of suitable habitat for rare plant species, spawning areas and habitats for juvenile and adult fish, amphibians and reptiles, and breeding and staging areas for many birds. Ecological functions such as regulation of water levels and water purification have also suffered.

Eleven endangered and rare species of higher plants and a number of mosses are associated with mires and other types of wetlands in Norway. Vulnerable bird species that breed on mires

include the common crane (*Grus grus*), broad-billed sandpiper (*Limicola falcinellus*) and great snipe (*Gallinago media*).

Mountains
Mountains cover 47 per cent of the mainland area of Norway. Together with the Norwegian Arctic and the northern parts of Sweden, Finland and Russia, these are the last remaining large areas of wilderness in Norway and Europe. The mountains around Snøhetta (the Dovre mountains) in Oppland and Sør-Trøndelag counties are the only intact mountain ecosystem in Europe west of the Urals where indigenous populations of wild reindeer, Arctic fox and wolverine still inhabit the same area. However, these populations are all vulnerable.

Several toxic metals originating from long-range transport of pollutants are found in relatively high concentrations in the liver and kidneys of grouse, hare and reindeer. The merlin (*Falco columbarius*) is one of the species that has suffered most from the effects of hazardous chemicals. DDE (a degradation product of DDT) has in certain periods resulted in thinning of its eggshells by up to 20 per cent. Levels of radioactivity in wild reindeer resulting from the Chernobyl accident are now 25-45 per cent of those in 1987.

Marine and coastal ecosystems
Norway's clean, clear coastal waters and naturally productive marine areas provide unique opportunities for harvesting high-quality seafood. Fish and fish processing have therefore traditionally been of fundamental importance for settlement patterns and human activity along the Norwegian coast, and have made a substantial contribution to the country's thriving coastal culture. In recent years, aquaculture has emerged as a new means of livelihood with a strong impact on settlement patterns and commercial activity in the coastal zone. It has also become an important export industry.

Marine areas under Norwegian jurisdiction include both coastal waters and shallow and deep areas of open sea. The North Sea and the Barents Sea are nutrient-rich shallow seas which are highly productive as a result of circulation patterns and the nutrient content. They are important nursery areas for a number of commercially-important fish stocks, and also very important feeding grounds for marine mammals and seabirds.

Most of the important fish stocks in northern waters have recovered from low levels in recent years. The stocks of Norwegian spring-spawning herring and North-east Arctic cod are expected to remain high in the next few years, but it is uncertain what impact the lack of capelin in the Barents Sea will have on the cod stock. The capelin stock will remain at a very low level for the next two years. Fish stocks in the North Sea are still very low, particularly those of North Sea herring and mackerel.

The common guillemot (*Uria aalge*) is the Norwegian seabird that has declined most strongly in recent years. Puffin (*Fratercula arctica*) numbers have been stable, but the population is still only 40 per cent of its size in 1979. The white-tailed eagle (*Haliaeetus albicilla*) is considered to be a vulnerable species globally. The Norwegian population reached a minimum around 1970, but has now increased again to about 1500 pairs.

Except for cases of local nutrient enrichment, large inputs of nutrients from the continent mainly have an impact on the Skagerrak coast. The Kattegat and parts of the North Sea are considered to suffer from eutrophication. In some fjord basins, the deepest water layers are

also deoxygenated as a result of nutrient enrichment, and the fauna in such areas has been almost wiped out.

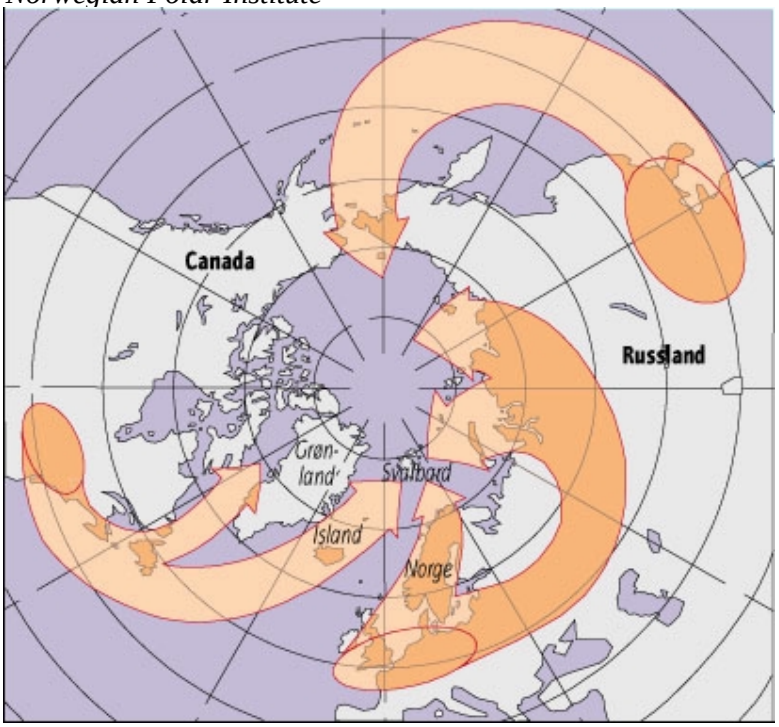
The Arctic
The Arctic Circle is defined as the southern boundary of the Arctic region. Using this definition, 163 500 km^2, or about 42 per cent of the area of Norway, is included in the Norwegian Arctic.

Svalbard, Jan Mayen and the northernmost parts of the Barents region include Europe's last large area of natural environment without infrastructure development. However, even the northern fringe of Europe has lost substantial wilderness-like areas in recent decades. The only exceptions are the archipelagos of Svalbard and Jan Mayen, which still consist almost entirely of wilderness. Norway has protected 56 per cent of the total area of Svalbard, and the protected areas also extend four nautical miles out from the coast. However, several habitats characteristic of the middle arctic tundra zone are poorly represented in the protected areas. These are the most productive terrestrial habitats in the region, such as inner fjord zones.

The populations of walrus, polar bear and Svalbard reindeer have all been close to extinction during the past 200 years as a result of hunting. From 1924 to 1973, hunting of these species was prohibited, and their populations are no longer endangered. It is estimated that there are now about 2000 polar bears and about 10 000 Svalbard reindeer on Svalbard. However, the population of Greenland right whale (*Balaena mysticetus*) has not increased significantly. In the 1600s, there were probably 20 000 - 30 000 Greenland right whales in the waters around Svalbard, but when the species was protected in 1929 it was almost extinct. The populations of fin whale (*Balaenoptera physalus*) and blue whale (*B. musculus*) in the Svalbard area are also almost extinct.

Disturbance of the environment and wear and tear of the terrain around settlements and mines have the greatest impact on the natural environment on Svalbard. However, the most important threats to Arctic mammals are connected with long-range transport of pollutants such as PCBs, pollution from industrial activities, and the prospect of petroleum and mineral extraction in the Arctic. The effects of the growing tourism industry may also constitute a threat if these activities are not controlled. In the long term, however, the greatest threats to biological diversity may be climate change and depletion of the ozone layer. Temperature changes and an increase in the intensity of UV-B radiation reaching the earth may have serious consequences for both terrestrial and marine ecosystems.

Figure 3 Dominant atmospheric transport routes for chemicals in the Arctic. Source: Norwegian Polar Institute



Causes of habitat, species and population loss

Alteration of ecosystems and habitats by development, various forms of land use and infrastructure development are assumed to have the most important negative impacts on biological diversity. Various forms of pollution, particularly acid rain, also have serious effects. Overexploitation has previously had major effects on relationships between species and stocks, but this effect is now more or less restricted to North Sea fish stocks, lobster, and wild salmon stocks. The introduction of alien organisms is also a growing problem.

Land use

The extent of change in land use ranges from major physical alteration that eliminates all biological production to relatively small changes in environmental conditions resulting in the loss of some species or the establishment of others. The fragmentation of large, almost untouched areas clearly affects animals that range over large areas, such as wild reindeer and the large predators, but also alters conditions for many other species. Many specialized species are associated with long-established ecosystems such as virgin forest and traditional semi-natural ecosystems (e.g. hay meadows, coastal heaths and pasture), and these disappear when environmental conditions change.

Agricultural developments have resulted in changes in the natural and cultural landscape, and changing practices have had an impact on biological diversity through altered land use and the introduction of new production methods. Forestry influences both the structure of forest landscapes and biological diversity through felling, drainage, soil preparation, the construction of forestry tracks and afforestation, sometimes using alien species.

Transport and communications installations occupy considerable areas of land and often result in the fragmentation and impoverishment of large areas of natural habitat. For example, animals often continue to use tracks that now cross modern lines of communication, and in 1997, 2 000 moose and 3 500 roe deer were killed on roads and railways. Roads in Norway are built both along rivers and fjords and in mountain and forest areas. Growing traffic, tourism, building of holiday cabins and the development of tourist facilities are other factors with an impact on biological diversity. The total length of public roads and forestry tracks in Norway is about 200 000 km, of which public roads account for about 90 000 km. Little further extension of the public road network is taking place at present.

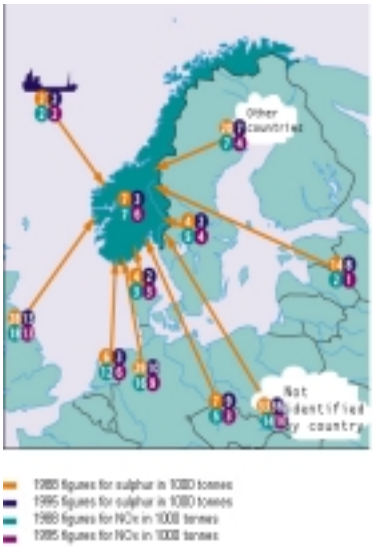
Some of the most serious disruption of the environment in Norway is caused by hydropower developments, particularly the establishment of reservoirs, the regulation or reduction of water flow in streams and rivers, the inundation of land and the construction of installations that act as barriers to animal movement and migration.

Pollution

Pollution is another serious threat to biological diversity in Norway. Acidification caused by long-range transport of pollutants is the factor that has had the greatest adverse impact. Other important factors with a negative effect on biological diversity are discharges of environmentally hazardous chemicals and inputs of nitrogen and phosphorus to river systems and the sea.

Acid rain costs Norway roughly NOK 3 billion every year. More than 90 per cent of the pollution originates in other countries (see figure 4). In large parts of Norway, the bedrock contains little calcium, and soils are thin and have little capacity to neutralize acid deposition. The Norwegian environment is thus particularly vulnerable to acidification caused by sulphur and nitrogen compounds (SO_2, NO_x and NH_3).

Figure 4 Sources of sulphur and nitrogen deposition in Norway in 1988 and 1995. Source: EMEP MSC-W.



Inputs of chemicals that are hazardous to health and the environment originate both from Norwegian sources and from long-range transport of pollutants in the atmosphere and in ocean currents. Local sources of pollutants include mines and industry, raw materials and finished products, the use of products by consumers and for occupational purposes, the transport sector, the agricultural sector and waste management. Petroleum activities on the Norwegian continental shelf have resulted in the pollution of large areas of the seabed by oil and chemicals. As much as 100 km^2 may be affected around some installations.

Damage caused by environmentally-hazardous substances in Arctic areas has proved to be more serious than previously believed. Persistent organochlorine compounds such as PCBs are effectively concentrated in the short food chains of the Arctic. Polar bears are particularly vulnerable to PCBs because they consume large amounts of seal fat. Concentrations of PCBs in polar bears from Svalbard have been found to be six times higher than those measured in polar bears from Alaska.

Over-exploitation

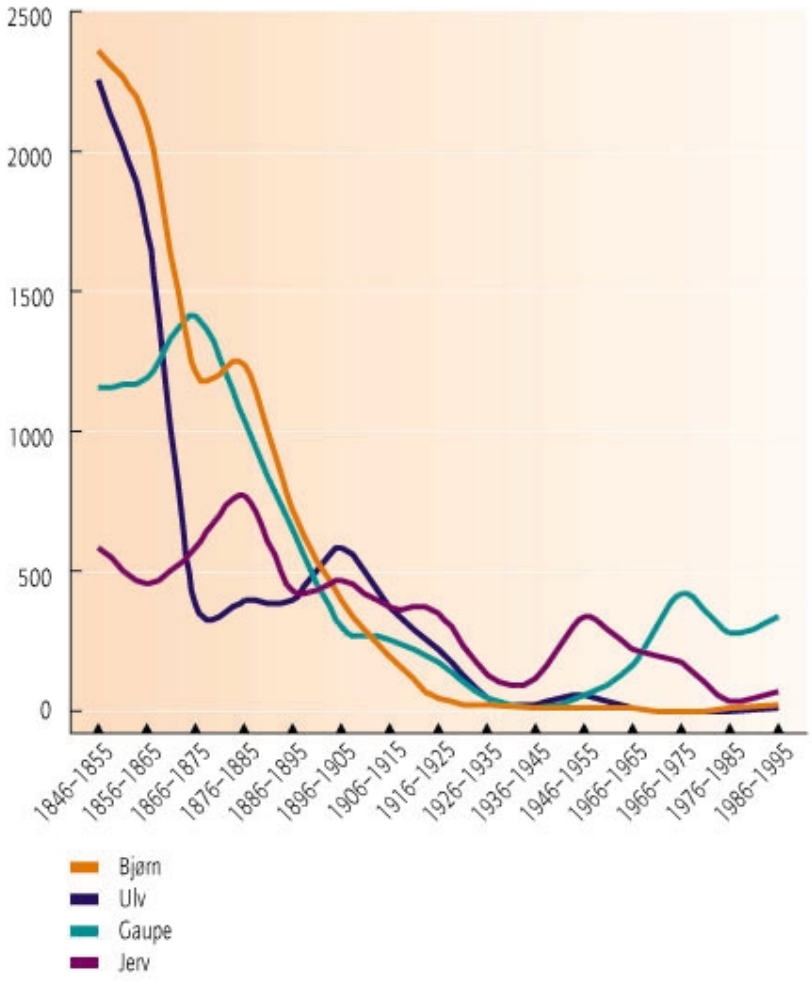
Fisheries and other harvesting of marine resources in themselves exert pressure on natural resources. Overexploitation of such resources can have major direct or indirect effects on marine biological diversity. The development of multi-species models and other measures to ensure more sustainable use of resources are therefore of great importance.

Herring and capelin are examples of species that have been overfished. When the Norwegian spring-spawning herring stock collapsed in the early 1960s, a key species in the ecological system of the Norwegian Sea and Barents Sea was lost. This had an adverse impact on several other important fish stocks and populations of seabirds and marine mammals. The collapse of the capelin stock in the 1980s had similar consequences.

The Norwegian spring-spawning herring stock has now recovered and is once again one of the most important resources harvested by the Norwegian fishing industry. The capelin stock is still very low and will not be fished for several years yet. Management regimes for the herring and capelin stocks now take account of the fact that these are key species in their ecosystems and of great importance for biological diversity in Norwegian marine areas, and that they must be used with caution.

Harvesting of wild species and stocks of large and small game and fresh-water fish is important in both commercial and recreational terms. In general, game stocks are currently large enough to give a satisfactory sustainable yield. However, wild populations of Atlantic salmon are declining markedly. Harvesting of the four large species of carnivores (wolf, wolverine, bear and lynx) is mainly related to conflicts with livestock and reindeer husbandry, and is subject to detailed regulation to ensure that sustainable populations of all four species are maintained in the long term. Arrangements will also be made to sustain commercial agriculture in areas where there are populations of these carnivores (cf figure 5).

Figure 5 Deaths of wolf, bear, wolverine and lynx in Norway (hunting and other causes) in 10-year periods from 1846-1995. No figures are available for lynx in 1985 and 1986. Historically, excessive hunting pressure has been the most important factor affecting populations of the large carnivores. Source: Statistics Norway



Breeding of crops and livestock

In the latter part of this century, we have been losing traditional plant varieties and livestock breeds as a result of breeding programmes and effectivization. We are thus losing genetic material which it is important to take steps to maintain for the future. A selection of local breeds and plant varieties is being preserved, for instance by gene banks. Norway plays an active role in the Nordic Gene Bank.

In about 1930, the Norwegian cattle population consisted of about 30 different breeds. These have now been incorporated into one population, called Norwegian Cattle (NRF), which includes 99 per cent of all dairy cattle. Several traditional cattle breeds are being maintained by in situ conservation and through the establishment of sperm and embryo banks.

The development of genetically modified products is most advanced as regards plants, where technology is being used to alter agriculturally-relevant properties such as resistance to pesticides or develop new product qualities such as longer shelf-life or improved taste and nutrient content. The long-term consequences of these developments are uncertain. However, apart from one plot of potatoes, no genetically modified organisms have been planted in or released to the Norwegian environment.

Introduction of alien species
The deliberate and accidental introduction of alien organisms has been increasing during the past hundred years. Plant and animal species deliberately introduced to Norway include the Canada goose, musk ox and various trees and other plants; others, such as mink and pineapple mayweed (*Chamomilla suaveolens*), have spread from farms and botanical gardens. Other species have been accidentally introduced through trade, tourism, in ships' ballast, etc. These include Canadian waterweed (*Elodea canadensis*) and the salmon parasite *Gyrodactylus salaris*.

Like most of the parties to the Convention, Norway has found that biological diversity is being impoverished and the number of endangered, vulnerable and rare species is increasing. This is not only a real result of negative impacts on biological diversity, but is also to some extent due to greater awareness of the problems and better registration of endangered and vulnerable species. We estimate the total number of plants and animals in Norway (excluding algae, bacteria and viruses) to be about 40 000. We only have sufficient information to determine the status of about 10 000 species, and of these about 5 per cent are endangered or vulnerable.

CONTRIBUTION OF THE VARIOUS SECTORS TO IMPLEMENTATION OF THE CONVENTION

ENVIRONMENT

After the UN conference in Rio, a new basis for Norway's environmental policy was provided by Report No. 13 (1992-93) to the Storting on the UN Conference on Environment and Development and Proposition No. 56 (1992-93) to the Storting on consent to ratification of the Convention on biological diversity. The previous chapters give a brief account of the most important elements of this policy and how it is organized. To develop a political platform to strengthen implementation of the Convention on biological diversity and environmental policy instruments, the Government has during the period covered by this report submitted a number of reports to the Storting:

- Report No. 13 (1992-93) to the Storting on the UN Conference on Environment and Development
- Report No. 22 (1994-95) to the Storting on environmental protection on Svalbard
- Report No. 40 (1994-95) to the Storting on coniferous forest protection towards the year 2000
- Report No. 29 (1996-97) to the Storting on regional planning and land use policy
- Report No. 35 (1996-97) to the Storting on the management of large carnivores
- Report No. 58 (1996-97) to the Storting on an environmental policy for sustainable development

Earlier work to strengthen our environmental policy and sectoral measures carried out during the report period together give a good basis for national implementation of Norway's obligations under the Convention on biological diversity. The main work of the environmental authorities involves two main types of activities: 1) those for which the environmental authorities themselves are responsible and have the necessary instruments at their disposal, and 2) those in which the environmental authorities play a coordinating or catalytic role or are responsible for monitoring other sectors whose activities have an impact on biological diversity. Cooperation between the environmental authorities and other sectors has been described in the general discussion of goals, strategies and organization, and further information will be found in the chapters on each sector.

For 1998, the Government has allocated about NOK 430 million of the environmental authorities' budgets to measures and activities to promote conservation and sustainable use of biological diversity. This will allow more effort to be put into the conservation of biological diversity, which has been defined as one of the three highest-priority areas in the field of environmental protection. The two others are climate issues and chemicals that are hazardous to health and the environment.

Responsibilities of the environmental authorities

Conservation of particular areas pursuant to the Nature Conservation Act

Conservation of particular areas pursuant to the Nature Conservation Act will continue to be an important element of efforts to safeguard biological diversity in Norway. At the end of 1996, Norway had 18 national parks (13 790 km^2), 86 protected landscapes (5 070 km^2), 1286 nature reserves (2 288 km^2) and 160 other protected areas (110 km^2). This gives a total of 1550 areas, covering a total of 21 260 km^2, or 6.5 per cent of the total area of Norway. Since 1993, the number of protected areas has increased by 124, covering a total of 547 km^2. In addition, there are 22 protected areas in the Norwegian Arctic in Svalbard, which cover 35 000 km^2, or 56 per cent of the archipelago. Norway has jurisdiction over large areas in Antarctica, and in 1993 ratified the Protocol on Environmental Protection to the Antarctic Treaty, which designates Antarctica as a natural reserve for at least 50 years.

The Storting has adopted a new nationwide plan for national parks, which is now being implemented in mainland Norway. The plan includes 51 large protected areas, and is to be implemented by the year 2008. In addition, work is continuing on national protection plans for mires, wetlands, rich deciduous forests and seabirds, which are to be completed by 2005, and on completion of the national plan for the protection of coniferous forests by 2000. Work on marine protection plans for coastal areas and the open sea is to be started, and the Government will review the protected areas in the Norwegian Arctic and evaluate proposals for new protected areas.

Implementation of the conservation plans mentioned above will result in the protection of about 13 per cent of mainland Norway pursuant to the Nature Conservation Act. The Storting and the Government have given priority to ensuring that conservation measures safeguard a representative cross-section of Norwegian nature. Some important types of habitats are still lacking in the plans that have been implemented or initiated; these include boreal rainforests, mountain birch forest, swamp forests, seashores and certain semi-natural vegetation types. Once sufficient results are available from the nationwide programme on methods of

surveying, valuing and monitoring biological diversity, an overall evaluation of Norwegian nature conservation will be carried out. Efforts to establish protected areas in Norway will therefore be maintained for the foreseeable future.

The group “other protected areas” above includes a number of cases where specific plants and their habitat are protected. These may apply to specific localities or to specific species wherever they occur in Norway. The only legal authority in Norwegian legislation for the protection of flora is provided by the Nature Conservation Act, but this is inadequate and should be re-evaluated in connection with efforts to implement the Convention on biological diversity.

More than half of the total biological diversity in Norway is associated with forests. In all, 120 000 km^2, or 37 per cent of the area of Norway, is forested. It is estimated that only about 2 per cent of the total area of forest is protected pursuant to the Nature Conservation Act.

Forestry operations are largely confined to productive coniferous forest in Norway. During the past five years, the environmental authorities have been implementing a conservation plan for productive coniferous forest which will cover about 569 km^2 and include all the main types of forest in this category. As regards other forested areas, the agricultural and environmental authorities and various organizations are cooperating closely on all aspects of forest policy. A report to the Storting on Norwegian forestry is being drawn up, in which the result of several years’ cooperation is being set out in a forestry policy which emphasises environmental considerations. However, in the course of this work, various issues that will need to be dealt with have been identified, particularly the industry’s proposals for considerable expansion of the network of forestry roads in the next few years. This will put pressure on ecosystems and biological diversity, and cooperation will be essential to avoid development in areas of great biological value, or to mitigate its consequences.

Protection of river systems

Norwegian electricity production is based almost entirely on hydropower, which together with acidification caused by long-range transport of air pollutants has resulted in serious losses and heavy pressures on the biological diversity associated with river systems. At present, 341 localities, which may be whole river systems or parts of them, are protected against hydropower development. If these were used for electricity generation, they could yield a total of 35 TWh, or 20 per cent of Norway's hydropower potential. The protection plan was adopted by the Storting, and there is as yet no separate legal authority for these measures. The plan was fully implemented in 1993, and as a general rule, localities are only protected against hydropower development. At the same time, a concerted effort has been made on a national basis to reduce or eliminate pollution, generally with very good results. In order to continue its efforts to protect Norwegian river systems, the Government adopted National Policy Guidelines for protected watercourses pursuant to the Planning and Building Act in 1994. These set out a framework for all administrative tasks of local and central authorities that may have an impact on protected river systems. Considerable efforts are being made to ensure that the Guidelines result in protection of river systems against a wider range of developments and impacts.

Norwegian river systems that have not been protected or already exploited for hydropower production account for about 23 TWh or 13 per cent of the country’s total hydropower

potential. These represent a large economic potential, but are also an increasingly scarce resource, and must be managed on this basis. The environmental authorities, together with the energy and hydropower authorities, have drawn up an overall evaluation of these water resources, taking into account the interests of both the hydropower industry and nature conservation and public interest otherwise. During the next two to three years, a new review of the remaining resources is planned, which will take account of the provisions of the Convention on biological diversity. The review will be presented in a report to the Storting on a system for ranking the remaining river systems for hydropower development purposes, taking into account their conservation value.

Conservation and sustainable use of species

In Norway, many species exist near the limits of their distribution ranges and under marginal conditions. The Norwegian populations of such species may therefore be genetically different from populations in more central parts of the distribution range. Genetic variation is of crucial importance for adaptation to changing natural conditions, and is an important element of Norwegian species management. The number of species occurring in Norway is estimated at about 40 000, but we only have sufficient information for about 10 000 of these to be sure of their status. However, genetic variation within species complicates this picture. A good example is the Atlantic salmon, which has several hundred populations, each with its own distinct genetic character after becoming adapted to its home river system through evolution during the last 8 000 - 10 000 years.

The Wildlife Act is administered by the environmental authorities and is based on the principle that all wild animal species are protected unless otherwise prescribed. The Act applies to mammals, birds, amphibians and reptiles, but there is no legislation that applies to other groups of animals. This means that the Act applies to 340 species, of which about 15 per cent may be hunted and 15 per cent are classified as endangered, vulnerable or rare. Harvesting of game species is only permitted for the purpose of using their meat or skins or to prevent them from causing damage, and under strict conditions that ensure sustainable use and do not jeopardize the survival of species and populations. In general, populations trends for Norwegian wildlife species are satisfactory, but there are certain problems. In the 1990s, these have mainly concerned the management of the four large predators, i.e. bear, wolf, wolverine and lynx, and to some extent white-tailed eagles (*Haliaeetus albicilla*), golden eagles (*Aquila chrysaetos*). The problems are related to the fact that their populations are endangered, vulnerable or of uncertain status, while the species do considerable harm to sheep and domestic reindeer. Claims for compensation for the loss of grazing livestock and strong pressure from farmers to be permitted to kill predators that are causing damage have led to growing problems in carnivore management in the last five years. In the 1996-97 season, three bears, 17 wolverines, 113 lynxes and 58 golden eagles were killed in Norway, most of them legally. Populations of eagles and osprey (*Pandion haliaetus*) are considered to be satisfactory today, while the numbers of the four large carnivores are 20-25 bears (no breeding in Norway), 5-10 wolves (breeding recently recorded in Norway), 200 wolverines and about 600 lynxes. Norwegian bears and wolves are mainly found near the border with Sweden, and almost all reproduction has so far taken place on the Swedish side of the border. To date, wolves are known to have bred in two localities in Norway.

Management of these four species in the period 1992 to 1997 has been based on Report No. 27 (1991-92) to the Storting on the management of bear, wolverine, wolf, and lynx. This was

followed up by Report No. 35 (1996-97) to the Storting on the management of the large carnivores, which will be used as a basis for their management in the next few years. Both Reports to the Storting state that Norway's policy is to build up viable populations of the large carnivores within the main distribution areas where they are currently found. On the other hand, expansion to new distribution areas is not a policy goal. When species and populations have reached specified levels in accordance with the IUCN criteria for survival and viability, measures to control populations, i.e. licensed hunting or hunting quotas, may be introduced to reduce conflict with grazing livestock. In special cases and according to specific rules, permits may be issued to kill individual animals that are causing particularly serious damage. The environmental and agricultural authorities are jointly responsible for promoting the goals of the policy drawn up by the Government and the Storting, both as regards the development of viable populations of large predators and as regards measures to limit the damage they cause by coordinating the policy instruments available to these authorities. This is expected to stabilize of carnivore management, and to result in population growth and regular breeding in Norway for the two most vulnerable species, bear and wolf.

The Act relating to salmonids and fresh-water fish provides the legal authority for the management of fish found in river systems, but only applies to a limited extent to other elements of the fauna and flora in fresh water. In all, 31 fresh-water fish species are registered in Norway, most of which are not classified as endangered, vulnerable or rare. However, a number of species are declining at population level.

Box 4 Management of salmon

As a result of environmental disturbance caused by human activities, such as watercourse regulation, pollution and acidification, the spread of disease and parasites, and the genetic impact and other effects of the large numbers of escaped farm salmon, many populations and the overall numbers of wild fish are clearly declining. Excluding rivers where populations are extinct, endangered, vulnerable, or of uncertain status, there are still populations of salmon in 349 rivers, sea trout in 761 rivers and sea char in 111 rivers. In order to preserve genetic material from endangered salmon stocks, the environmental authorities have for several years been building up gene banks. Milt from 162 salmon stocks, several of which are now extinct, has been preserved by deep-freezing.

Despite the fact that the environmental authorities are making greater efforts to safeguard anadromous salmonids than ever before, for instance through very strict conservation measures and restrictions on fishing, and through extensive liming of acid lakes and rivers, the decline of these species is continuing.

There is general agreement that genetic diversity has great intrinsic value in addition to being very important for commercial interests throughout the world. In the last 20-30 years, Norway has developed a fish farming industry based on genetic material from a range of salmon populations. This has developed into an export industry with a value of NOK 7.5 billion, or one third of Norway's total fish exports. The weight of fish produced by the fish farming industry is now greater than total meat production by the Norwegian agricultural sector.

Fresh-water fish species have also declined to some extent in recent years, but less markedly than the anadromous species. Various forms of development, pollution and acidification, the introduction of alien fresh-water organisms and overfishing are the most important causes of

the decline. To mitigate their effects, a five-year fresh-water fish programme was started in 1994. Its activities include measures to strengthen the local fisheries administration and to encourage municipalities and people who hold fishing rights to take greater part in management of the resources, for instance by drawing up plans for joint management of fish stocks.

Two types of measures to improve species management are being developed for the administration of game and fish species that are regularly harvested. In 1996, a coordinated state coastal inspectorate was established and put into operation, to strengthen control and inspection measures in marine and coastal areas. In 1997, the environmental authorities established the Norwegian Nature Inspectorate, which will be responsible for strengthening control and inspection measures in all fields of nature management in terrestrial environments. The environmental authorities also initiated a major Agenda 21 programme in 1997, which is to reorganize the administrative system for wildlife and fish. Its aim is to ensure that, within a framework set out by the state, the local administration is as a general rule based on management plans by the year 2006.

Apart from measures that the state can manage or carry out, Norway has chosen to focus on local coordination and awareness-raising, which also entails obligations and responsibilities for holders of fishing, hunting and other rights and users to strengthen species management. In addition to this, a programme has been started involving selected municipalities, which is to be extended to cover all municipalities in 1999. Each municipality is drawing up its own plan for biological diversity, and classifying all relevant ecosystems (river systems and other outfield areas) according to the value of their biological diversity, on the basis of centrally produced guidelines (see the description of the programme in the chapter “Improving our knowledge of biological diversity»).

Species management in the Norwegian Arctic

Physical conditions in the Arctic are extreme, reaching the limits that biological organisms can survive. Arctic ecosystems are therefore simple and contain few species, but the populations of each species are often large. The interplay between marine and terrestrial ecosystems are of crucial importance in areas such as Svalbard. The protected areas of land mentioned previously therefore extend four nautical miles out to sea. Almost all of Svalbard is still untouched wilderness, practically unchanged since people first arrived on the archipelago 400 years ago. There are no large, continuous areas of natural wilderness of this kind left in mainland Europe. The need for conservation of biological diversity is satisfactorily taken into account since 56 per cent of the area of Svalbard’s islands has been protected during the past 25 years. Apart from this, legislation on the management of wildlife and fish in the archipelago has been in force for over 20 years. There are populations of Svalbard char in more than 100 rivers, some of them anadromous and some stationary and all genetically adapted to their home rivers. There are indications that the populations are more than 100 000 years old, and they may be the origin of the char populations that have spread to Norwegian river systems after the end of the last ice age about 10 000 years ago. Fluctuations in the Svalbard char populations currently appear to be entirely natural.

Most species of animals are permanently protected on Svalbard. Only 9 species of birds and three species of mammals (Arctic fox, ringed seal (*Pusa hispida*) and bearded seal (*Erignathus barbatus*)) may be hunted, and an annual hunting quota of Svalbard reindeer is

allocated to local residents. Animal populations appear to fluctuate with natural conditions, and some species that were formerly not very numerous have shown a marked increase in recent years.

Box 5 Threats to biological diversity on Svalbard

Norway's goal is to ensure that Svalbard is one of the best-managed wilderness areas in the world. To achieve this, the wilderness character of the archipelago and its biological diversity must be protected. In addition, resource utilization must be kept within responsible limits. However, two factors will pose serious threats to biological diversity on Svalbard in the near future.

The first is the prospect of changes in the marine ecosystem in the Barents Sea. Marine production has a major direct and indirect impact on many bird and mammal populations, including polar bears, seals and whales and the millions of breeding seabirds. The overall effect of current fisheries management regimes in the Barents Sea has been to increase pressure on marine ecosystems. This is a challenge in both scientific and political terms, and the Norwegian fisheries authorities are seeking to resolve the problems in national and international fora.

The second factor is the very high concentrations of organochlorine compounds which investigations in recent years have shown in food chains in the Barents Sea and on Svalbard. Animals at the top of food chains, such as polar bears and glaucous gulls (*Larus hyperboreus*), are particularly vulnerable. Samples from polar bears from Svalbard have shown PCB concentrations six times higher than those measured in polar bears from Alaska. The same levels have been shown to induce cancer and impair reproduction in mammals in laboratory tests. The Government has intensified research efforts to obtain further knowledge of the extent and effects of long-range transport of persistent organic compounds and heavy metals and the sources and input routes for such marine pollutants. The data obtained will be used actively within the framework of international agreements on reductions in the use and emissions of such substances.

Cross-sectoral work by the Ministry of the Environment

The chapters of this report dealing with the main national challenges and strategies, inter-ministerial cooperation and biological diversity in Norway describe the Government's goals, strategies and activities and the way the overall implementation of the Convention on biological diversity is organized. The environmental authorities are responsible for coordinating the Government's efforts through cooperation with all relevant sectors. Even when 13 per cent of the total area of Norway has been protected pursuant to the Nature Conservation Act, the way the remaining 87 per cent is used will in practice be of decisive importance for whether we can prevent further losses of biological diversity. Much the same is true of species management; human activities in general will have a greater impact on the extent to which we succeed in preserving species, population and genetic diversity than the specific conservation and regulatory measures available to the environmental authorities in wildlife and fisheries legislation. It is therefore particularly important to ensure that the environmental authorities develop the necessary foundation for putting cross-sectoral cooperation into practice in accordance with the Government's goals; this applies particularly to instruments that are needed in policy development and decision-making processes.

The single most important challenge we face in efforts to conserve biological diversity is to procure a sound scientific basis for decision-making and generally available information systems that make use of knowledge, data and continuous monitoring to devise coherent, purposeful and effective arrangements for the management of biological diversity. Up to 1997, two major research programmes have been carried out that are relevant in this context, one on biological diversity and one on sustainable management of shared biological resources. A strategy for monitoring biological diversity in Norway has also been drawn up (DN report 1995-7) (cf p. 9). Monitoring systems will be specially adapted to the following environments: forest, mires and wetlands, cultural landscapes, mountains, inland waters, marine and coastal areas, and arctic areas. They will focus on areas of rare and threatened habitats and on representative habitats. Monitoring at species and population level will focus on endangered and vulnerable species, species which have key ecological functions and species that are important as indicators of the overall state of ecosystems.

According to plan, the monitoring programme is to be fully operative by 2003. The information it provides is to be used by all relevant sectors, and these sectors are to provide some of the funding needed to run the monitoring programme. For further details, see the description of the programme in the chapter “Improving our knowledge of biological diversity”.

In addition to the research programmes mentioned above, the environmental authorities have followed up their responsibility for monitoring biological diversity by initiating several other monitoring programmes and monitoring of selected species that require special attention. Since 1984, Norway has participated in a European forest monitoring programme in order to establish the extent of damage to Norwegian forests, identify development trends over time, and reveal the extent to which long-range transport of air pollution results in forest damage in Norway. Forests are also included in the current monitoring programmes for terrestrial habitats. The terrestrial monitoring programme is intended to reveal any impact of long-range pollution and major long-term environmental changes. This will be done by monitoring eight selected areas and by running nationwide and regional studies. The terrestrial monitoring programme also includes studies of the fauna, including monitoring populations and breeding of various species of birds.

There are extensive arrangements for monitoring inland waters, particularly as regards the following threats to biological diversity: long-range transport of pollutants, nutrient enrichment and hazardous chemicals, acidification, disease, infections and alien species, regulation for hydropower purposes, and escaped farm fish. In addition, Norwegian rivers with stocks of anadromous salmonids are monitored and classified to decide how river systems are to be managed and to draw up guidelines for open seasons for fishing.

AGRICULTURE

Existing goals

One objective of Norwegian agricultural policy is to ensure that maintenance of the qualities of the natural and cultural environment is an integral part of agricultural activities. This includes the conservation of biological diversity in or associated with agricultural landscapes. Maintenance of the agricultural landscape and protection of cultural monuments and listed farm buildings are important measures. In addition, priority is being given to measures to reduce pollution, reduce the risk of pesticide use, promote environmentally-sound production methods and products, encourage organic farming and to set standards for environmental considerations in agricultural operations. Many economic and legislative instruments are intended to serve several purposes, such as maintaining settlement in rural areas, conservation of biological diversity and other environmental qualities.

If we are to succeed in these efforts, it is essential to build up sufficient knowledge and awareness of the importance of biological diversity among farmers, the general public, researchers and administrative agencies. As regards agricultural policy, the strategy concerning biological diversity can be divided into three main parts:

1. The impact of human activity on ecosystem functions is of crucial importance for the degree to which biological diversity is changed, either positively or negatively. A central element is therefore to maintain variation between and within species and ecosystems through sustainable use of biological diversity and conservation measures.

2. The second element is to develop agricultural techniques that maintain life-sustaining ecological systems. The total environmental stress caused by pollution and inputs of environmentally hazardous substances is to be reduced to avoid disturbing central ecological processes in water, air, soils and vegetation.

3. The third element is to promote sound use and conservation of genetic resources through research, breeding programmes and the development of biotechnology. The aim is to intensify efforts to maintain herds of traditional breeds of livestock in situ and to develop an efficient system of gene banks for crop plants. Work on breeding programmes and sound overall land-use and natural resource management must focus particularly on ensuring that decision-makers at all levels have the necessary basic knowledge and awareness of biological diversity.

Experience and action since the Convention entered into force

In 1994, the Ministry of Agriculture drew up an action plan for the conservation and sustainable use of biological diversity as one step in the implementation of the Convention on Biological Diversity. The plan is intended to ensure that government efforts in this field are coordinated and have optimal effect. Since 1994, various acts and regulations have been revised to include new or clearer environmental provisions. A number of administrative and organizational measures have also been implemented, and steps have been taken to improve knowledge and increase awareness of biological diversity and its importance.

Agriculture

Information on biological diversity in the agrarian landscape was one element of the project on the agrarian landscape run by the Ministry of Agriculture from 1991 to 1997. Information activities and training courses were targeted towards local agricultural offices, organizations and landowners, with a view to encouraging initiatives and generating interest through the implementation of practical measures. Meeting places have been established at county level for the agricultural, environmental and cultural heritage authorities and county branches of farmers' organizations to improve joint understanding, strategies and cooperation. This has led to the preparation of local action plans for the maintenance of selected agricultural landscapes.

A national inventory of agricultural landscapes has been drawn up by the agricultural and environmental authorities. Proposals for management plans for the areas covered by the inventory are being drawn up, and these can be used to evaluate management measures and decide on priorities for the use of policy instruments in the counties. The Cultural Landscape Research Programme ran from 1991-1995 and was funded by the Ministry of Agriculture, the Ministry of the Environment and farmers' organizations. Several of the projects included in this programme were concerned with biological diversity in the agrarian landscape.

Programmes for baseline monitoring and result monitoring for both agriculture and forestry have been started so that progress towards our goals can be followed and any necessary measures taken to achieve them. The baseline monitoring programme for agriculture has surveyed runoff and leaching of nutrients, soil particles and pesticides. From 1997, the programmes have been expanded to include inputs and runoff of environmentally hazardous substances from agricultural land.

A monitoring programme for the agricultural landscape is being established from 1998. This will monitor biological diversity by mapping indexes of change for ecotones, man-made structures, hedges and the structure of the landscape.

Another major programme, which deals with quality control systems in agriculture, includes a project on environmental and natural resource plans. This is being run by the farmers' organizations themselves and is a voluntary system for environmental and natural resource planning on individual farms. Registration of biological diversity, elements of the cultural landscape and cultural monuments and management proposals are all important elements of the system, which has resulted in much greater interest in measures to conserve the cultural landscape in areas where the work is well under way.

It is an important goal for the agricultural sector to maintain the diversity of natural and semi-natural vegetation types locally, regionally and nationally. Some semi-natural vegetation types are species-rich ecosystems, whereas others, such as heaths, are poor in species. A common feature of semi-natural vegetation types is that the plant communities are usually associated with particular management regimes which are necessary to maintain the ecosystem, the character of the landscape and individual species found there.

The importance of conserving integrated cultural landscapes has been emphasised in dealings with farmers and local authorities, but certain elements have been given priority as regards the use of instruments to maintain biological diversity. These are upland summer pastures, herb-

rich hay meadows, wooded pasture, heaths, hay meadows in outfields, wetlands and mires, seashore meadows, harvested deciduous forest, dry-stone walls, heaps of stones cleared from fields, artificial ponds, streams and wetlands. However, measures to conserve semi-natural vegetation types, particularly those that are no longer in normal agricultural use, are difficult and require substantial resources. Such measures have not yet received sufficient attention, and a considerable effort will be required in the future.

Acreage and cultural landscape support is a type of financial support that is granted to all holdings with an area of at least 1 hectare and production above specified levels. It is intended to improve income levels on such farms and as an incentive to maintain the use of agricultural areas.

This is a cross-compliance scheme, which means that farmers must comply with other conditions to be eligible for grants. These conditions are concerned with maintenance of the main elements of the cultural landscape and environmentally-sound agricultural operations, and are also intended to ensure that suitable habitats for animals and plants, important historical features, the scenery and opportunities to experience the landscape are maintained. These conditions are as follows:

> rivers, streams and open ditches may not be culverted or piped, and the edges of woodland, ecotones, and other residual uncultivated areas may not be cultivated.
>
> Islands of natural vegetation in fields, dry-stone walls and clearance cairns may not be removed, and old roads and lanes shall not be cultivated or closed.
>
> Agricultural areas shall not be levelled and ecotone vegetation shall not be sprayed.

The farmer is also required to comply with the legislation relating to agricultural production in force at any given time. Compliance with these conditions is monitored by spot checks of five per cent of the holdings each year. If a farmer is found to have contravened the provisions of the regulations, the grant may be withdrawn for up to three years.

The scheme for extended support for landscape maintenance and development provides grants to safeguard natural and man-made landscape features that are too expensive to maintain by means of normal agricultural practices on working farms. Grants must be applied for separately.
Grants may be given for measures to conserve biological diversity, for the management of traditional semi-natural vegetation types, for measures to improve access to and provide opportunities to experience the agrarian landscape, and for the preservation of cultural relics and protected and listed farm buildings. In the period 1993-1996, grants given under this scheme totalled NOK 160 million, and the conservation of biological diversity and traditional semi-natural vegetation types were given as grounds for about 25 per cent of the applications. Other smaller grant schemes also have similar purposes.

When the Land Act was revised in 1995, its purpose was amended, and it now requires the use of resources to be planned on the basis of conservation of cultivated or cultivable land, conservation of the cultural landscape and environmental considerations.
Important elements of the Act include the authority to lay down regulations relating to environmentally sound farming systems and regulations prescribing that it is no longer permitted to cultivate new land or construct agricultural roads without the approval of the

municipality, which must give special weight to environmental qualities such as biological diversity and cultural monuments in evaluating applications.

Other schemes and regulations of importance for the conservation of biological diversity that have been implemented in the period covered by this report are as follows:

- Grants for amended soil management, which may be provided for areas where the soil is not tilled in autumn or where catch crops are sown or grassed waterways established to counteract erosion. Almost half of all agricultural land classified as vulnerable to erosion forms part of the scheme.
- Investment grants for environmental measures, including support for planting vegetation to complete the existing green structure and increase the level of variation in the landscape. This scheme also includes ecological purification systems using runoff through sedimentation dams and vegetation zones to prevent pollution directly into watercourses.
- Several instruments have been used to promote ecological agriculture, and regulations have been laid down requiring all farms to draw up fertilization plans. From 1990 to 1995, a plan of action for the reduction of pesticide use has been implemented. This is now being evaluated and proposals for its continuation are being drawn up.
- Grants for summer farming with dairy production.
- Regulations requiring farms to have at least 0.4 ha spreading area per animal manure unit
- Regulations requiring that all cattle are put out to pasture for a minimum of 8 weeks each summer
- Regulations requiring all farmers to draw up plans for fertilizer management.

The conservation of agricultural genetic resources is coordinated through the work of the Nordic Gene Bank (NGB), which is one of the Nordic institutions under the Nordic Council of Ministers. Nordic working groups collect, document and describe important agricultural and horticultural plants and related wild plants. Genetic material is stored in the form of seed samples in a gene bank below the permafrost on Svalbard, and many plants are also preserved in situ.

At national level, the Norwegian Agricultural Museum is responsible for genetic material from livestock. It has a committee for genetic resources which promotes conservation measures, registers material and acts as a contact point nationally and internationally. As well as sperm and embryo banks, the gene bank has established in situ herds for a number of species, for example for all but one breed of cattle.

Forestry

In terms of forest policy, efforts to implement the convention have been concerned particularly with arrangements to improve adaptation to the environment in practical forestry operations. It has also been considered important to comply with the principles and undertakings Norway has adopted through its participation in international and European processes concerning forests. Since the Convention entered into force, a number of forest policy measures have been implemented. These include amendments to the legislation, information measures, capacity-building and a number of administrative measures to ensure more purposeful use of the instruments available and better organization of this work. These efforts have focused on increasing awareness of the importance of taking landscapes and

habitats for animals and plants into consideration when implementing forestry measures. Research and development have provided important input for changes in forest policy.

Changes in forest policy include a number of new environmental provisions and set out more clearly the responsibility of the forestry industry for managing biological diversity. The changes include amendments to the Forestry Act and regulations laid down pursuant to the Act, and adjustments to the overall system of state grants to the forestry industry. The forestry authorities have for example drawn up new rules for building forestry roads, silviculture, seed supplies and the use of alien tree species, forest management and phytosanitary measures. Economic incentives are being used to encourage forest management across property boundaries, and economic instruments have also been adjusted to promote appropriate measures and considerations in biotopes with special environmental qualities.

The forestry authorities have considered it particularly important to provide incentives for the development of county strategies within the framework of our national forest policy, and have issued guidelines for the preparation of general plans for forest management at municipal level. In connection with this, projects have been run in individual municipalities in which the integration of biological diversity concerns has been made a central element of the development of such plans. Specific guidelines elaborating the relevant provisions of the Forestry Act have also been drawn up in the context of the Convention on biological diversity. These deal with the use of forestry grants in areas with special environmental qualities.

The forestry authorities have also initiated a major project to survey and register localities with special environmental qualities. The objective is to develop an operational tool for use in forest management on individual properties.

Arrangements for contact and information between the forestry and environmental authorities have been established to facilitate cooperation and joint projects. In this connection, several joint conferences have been held for representatives of the forestry and environmental authorities at various levels.

A major research programme on forest ecology and multiple use forestry has been carried out. The results have been used in developing a new major research programme dealing with interactions between forests and the environment, industry and society. The Norwegian forestry industry is strongly committed to national efforts to ensure environmentally-sound forestry and protection measures.

Box 6 Living Forests

The forestry and environmental authorities, together with forestry and conservation organizations, industry and an number of other participants, have been cooperating on a major three-year project called “Living Forests”, which will be concluded in 1998. One element of the project is the development of criteria, indicators and standards for sustainable forestry. This work is based on the international dialogue on forests, including UN-related and European processes, and market developments. In parallel with this project, a separate project group has been established to review the potential and possibilities of a certification system for the forestry sector. The certification group is to base its work on the standards for sustainable forestry drawn up by the “Living Forests” project.

At regional level, associations of forest owners have arranged courses and seminars on environmentally-sound forestry for their members, in which representatives of the local forestry and

environmental administration have also been involved. In Norway, ownership structure is such that most of the forested area consists of small farm forests and the number of owners is large. An awareness of these issues and knowledge about the conservation of biological diversity that can be used by individual owners in planning their operations are therefore of great importance for the achievement of practical results.

Reindeer husbandry

The Sami are a minority in Norway, and are categorized as indigenous people. Domestic reindeer husbandry is a traditional Sami means of livelihood, and is practised by the Sami in six of Norway's 18 counties today. Sami reindeer husbandry is concentrated in Finnmark county at a latitude of about 70^{o} N, where its impact on the environment in the form of overgrazing and wear and tear on vegetation caused by offroad vehicles is also greatest.

Further information on the Sami is presented in a later chapter. In this section, we briefly describe the application of the two main instruments of government policy available to the Ministry of Agriculture to control the direct impact of domestic reindeer husbandry on the natural environment and biological diversity. These are the Reindeer Husbandry Act and the reindeer husbandry agreement.

On the basis of Report No. 28 (1991-92) to the Storting on sustainable reindeer husbandry, the Act relating to reindeer husbandry was revised in 1996. The amendments to the Act permit greater control of resource utilization by reindeer husbandry and give reindeer owners greater responsibility. Each reindeer husbandry district is now required to draw up a management plan and reindeer owners may be required to pay a resource tax if the pressure on shared resources is greater than a certain level. Furthermore, the amendments introduce the legal authority to structure reindeer herds, for instance by slaughtering to give optimal production adapted to the resource base. The use of offroad vehicles on ground without snow cover is also to be restricted, and as a general rule to be limited to the routes indicated in the district plans.

The reindeer husbandry agreement is mainly an economic agreement between the state and the reindeer husbandry industry. The use of policy instruments in the agreement has changed substantially since the Convention on biological diversity entered into force. To protect the vulnerable winter grazing grounds and prevent overgrazing, current grant schemes encourage an earlier date for the annual slaughter. An upper limit of 600 animals per operating unit has also been introduced. Units with a larger number of animals will lose their production support. This is an important measure for reducing the number of reindeer to a level better adapted to the available resources.

Challenges and planned action

Substantial funds from the Ministry of Agriculture's 1998 budget have been allocated to environmental measures. Much of this, totalling about NOK 350 million, is related to biological diversity. This includes action to follow up existing measures and reinforcement of our efforts through new measures.

Agriculture

In 1998, a nationwide system for baseline monitoring and result monitoring in the agricultural landscape is to be taken into use. This will improve the basis for evaluating developments and the use of policy instruments in the agricultural sector by monitoring various factors including:

- biological diversity, natural and semi-natural ecosystems and the extent to which semi-natural vegetation types become overgrown.
- land use and ownership structure, extent of residual uncultivated areas, ecotones, etc.
- buildings, cultural monuments and valuable archaeological features.
- landscape qualities, value for recreation and opportunities for access.

Forestry

The Government is to carry out a comprehensive review of forest policy, and a report will be submitted to the Storting in the course of 1998. The economic importance of the industry, resource management and environmental protection will be central elements in the report. It will also include a review of environmental measures in forestry and the responsibility of the forestry sector for conservation and sustainable use of biological diversity. In addition, ways of incorporating and strengthening the role of biological diversity concerns in the forestry sector will be considered and the need for a new Forestry Act will be evaluated.

Reindeer husbandry

For the reindeer husbandry sector, revision of the boundaries of the reindeer husbandry districts will be started in the three northernmost counties, where grazing pressure by domestic reindeer is heaviest. Improvements in this respect should lead to more sustainable use of grazing grounds and reduce the pressure on vegetation in vulnerable areas. To counteract overgrazing and reduce motor traffic in connection with reindeer husbandry, a cooperation project involving the industry, the country's most important reindeer husbandry municipality and the Sami, agricultural and environmental authorities is being developed. The project involves setting aside a large reindeer grazing area where intensive use will be prohibited so that natural restoration processes can be followed for some years.

FISHERIES

Existing goals

The Ministry of Fisheries is administratively responsible for fishing, whaling and sealing, aquaculture, seaweed harvesting, ports and coastal shipping. Norway is an important fishing and maritime nation in international terms, and these industries have therefore influenced settlement patterns in coastal areas and the way coastal and marine environments are used. Almost all activities within the Ministry of Fisheries' sphere of responsibility have an impact on the conservation and use of biological diversity along the coast, in fjords and at sea. Fisheries and aquaculture have an impact on biological diversity through changes in the size and distribution of wild stocks, effects on the benthic fauna and flora, genetic changes brought about through breeding programmes and local environmental changes caused by pollution or the spread of disease. Shipping also affects marine biological diversity through normal operational discharges and shipping accidents. Acute discharges of oil and chemicals in coastal areas are associated mainly with the heavy tanker traffic resulting from the high level

of petroleum activities in Norwegian waters. On average, there are almost 100 acute discharges of various sizes per year in Norwegian waters.

The overall goal for the fisheries authorities is to conserve biological diversity and manage in such a way that it provides a basis for a sustainable, profitable fisheries and aquaculture industry. To achieve this, the authorities will:

- Continue sustainable fisheries management with a long-term perspective, based on restrictive quota and control and inspection policies and strict regulation of the capacity and structure of the fishing fleet. Resource and quota control will be further strengthened.
- Further develop a multi-species management regime, based on an ecosystem approach, the precautionary principle and continued extensive research. Selective fishing techniques will be further developed.
- Reduce emissions from the fishing fleet, fish farming, industry and activities associated with the petroleum industry.
- Reduce the number of escapes from fish farms to avoid genetic influence on wild fish and take preventive measures to reduce the spread of disease and the use of medicinal products.

Experience and action since the Convention entered into force

To achieve the goal of harvesting marine resources sustainably, major investments have been made in marine research and in monitoring stocks. Much effort has also been put into the development of regulatory and inspection systems to ensure that there is a balance between the harvest and marine production.

Together with favourable climatic conditions in the sea, these efforts have contributed towards the positive developments in fish stocks we have witnessed in the Barents Sea and along the Norwegian coast in recent years.

In contrast, trends in fish stocks in the North Sea, where Norway and the EU have joint responsibility, have been generally unfavourable, and in some cases disquieting. Together with the EU, Norway has focused on finding suitable ways of improving current harvesting patterns. These include measures to improve selectivity and to reduce dumping of bycatches and catches from depleted stocks. Norway has also emphasized the need for sound control measures to help stocks to recover to sustainable levels. The results of the North Sea Conference will in this connection be channelled directly into our bilateral fisheries cooperation with the EU. The parties have already started processes to ensure that the precautionary principle is applied, to improve technical measures to regulate fisheries and to intensify resource and quota control.

Norway is also working for a better, more holistic approach to management of fish stocks in international waters within international fisheries management organizations such as the NEAFC and the NAFO. Better resource and quota control has already been achieved through measures such as common reporting standards and better routines for the exchange of information between different countries' fisheries authorities.

One subject that has aroused particular interest internationally is the hunting of marine mammals. Norwegian policy in this respect is based on the same principles as the management of other living marine resources, i.e. to permit sustainable catches of stocks that

can support harvesting, and to protect endangered and vulnerable stocks. Within this framework, Norway currently permits limited catches of minke whale (*Balaenoptera acutorostrata*), harp seal (*Pagophilus groenlandicus*), hooded seal (*Cystophora cristata*), common seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*). All other species of marine mammals in Norwegian waters are currently either protected or not of commercial interest.

In recent years, the fisheries authorities have invested considerable resources in the development of satellite-based communication systems for use in resource and quota control. The technology makes it possible to carry out such activities more efficiently. A project on the implementation of satellite monitoring will be completed in 1998.

Another important field of research is fisheries technology and fish behaviour; this can enable us to harvest marine resources without inadvertent side effects. The development of sorting grids for trawls ensures that young fish and fry are not caught accidentally. During the period covered by this report, Norway and Russia have introduced a requirement to use sorting grids in shrimp and cod trawls in the Barents Sea. Projects to find ways of avoiding catches of seabirds in fishing gear have also been carried out, and a method of preventing catches of seabirds in long-lining gear has been taken into use.

Several measures have been implemented to adjust fishing capacity to the resource base and to reduce pressure on fish stocks. The Norwegian fishing fleet is regulated by means of licences, and in recent years a scheme has been introduced that rewards shipowners who remove vessels permanently from the fishing fleet with an extra quota for their remaining vessels for a certain number of years. Licensing arrangements and other measures put the authorities in a position to ensure that the fishing fleet is adapted to the available resources.

A report on measures to strengthen monitoring and research activities related to the petroleum industry has been drawn up, and its recommendations concerning the control of discharges and the long-term effects of discharges from the Norwegian continental shelf are to be implemented, with special emphasis on environmentally hazardous substances and products. Furthermore, Norway and Russia are cooperating on surveys and monitoring of radioactive pollution in the Barents Sea.

The ocean climate has a major impact on biological production in the oceans, and climate changes have therefore been followed for more than 60 years, with a view to discovering how they affect fish resources through the various stages of food chains. The results have provided a basis for more recent research cooperation with Russia, which has resulted in the development of a multi-species model reflecting interactions between stocks and between different levels in the food chains. The goal is to develop a multi-species management regime in which decisions are made after an overall evaluation of these interactions. The model is already being used as part of the basis for quota recommendations for cod, capelin and Norwegian spring-spawning herring. The development of the model has revealed a need for more data on various parts of the food chains. These research and development programmes have provided a good basis for monitoring biological diversity in marine areas, and have resulted in a joint strategy report drawn up by the fisheries and environmental authorities (DN-report 1995-7 Strategy for monitoring of biological diversity). This cooperation is being continued with a view to developing a programme for surveying and monitoring biological diversity in marine and coastal areas.

Aquaculture

Report No. 48 (1994-95) on the importance of aquaculture as a Norwegian coastal industry sets out the Government's aquaculture policy and examines the industry's growth potential. The main goal of Norway's aquaculture policy is to ensure that the industry develops in a balanced and sustainable manner, and that it becomes a profitable, vigorous industry in outlying districts. Norway's coastline is 5000 km long, and includes many fjords, islands and clean waters that provide uniquely suitable natural conditions for farming marine species. The Atlantic salmon is the most important farmed species in economic terms, and total sales in 1996 were almost 310 000 tonnes. Aquaculture production is expected to grow by 10-15 per cent per year in the near future. Every production facility for fish and shellfish is required to have official approval in the form of a separate licence. The fisheries authorities are responsible for administering the Aquaculture Act, the agricultural authorities for the Act relating to measures to counteract diseases in aquatic organisms and the environmental authorities for the Pollution Control Act and for the management of wild salmon stocks. These authorities are cooperating to achieve environmental objectives for the industry, which in order of priority are escapes, diseases, medicines, chemicals and organic matter. The results are monitored annually.

The industry has made a great deal of progress in combating disease. Preventive measures and the development of vaccines have resulted in a dramatic reduction in the consumption of antibiotics. In 1996, the industry accounted for less than 4 per cent of total consumption in Norway. A new Act relating to measures against disease in fish and other aquatic animals has been adopted, and entered into force on 1 January 1998. This focuses more closely on the relationship between the aquaculture industry and wild stocks and on overall environmental conditions. Pollution from the industry has also been greatly reduced by recycling more than 90 per cent of the fish waste and a steep reduction in discharges of nutrients. The fisheries and environmental authorities are cooperating on the development of a new system for modelling and monitoring fish farms. The system will specify threshold limits for acceptable environmental impact and include a monitoring system and simulation model for calculation of environmental impact (discharges of organic material and nutrients) over time, so that fish farm operations do not have an environmental impact exceeding the carrying capacity of the locality.

Further efforts are required in certain fields, particularly to reduce the number of escapes from salmon farms, in order to reduce the risk of spreading disease and the genetic impact on wild salmon stocks. The number of escapes reported dropped from 700 000 to 300 000 salmon in the period 1993-1996, but the proportion of farm salmon in Norwegian rivers has remained relatively stable and gives cause for concern. Protected zones where no new fish farms may be established have been established near the mouths of salmon rivers, and the control of fish farms and requirements for improvements of installations and operating routines are under continual evaluation. Salmon lice (a fish parasite) pose serious problems for the fish farming industry. An action plan has been drawn up to combat the parasite, and efforts to find efficient and environmentally acceptable solutions to such problems will continue to be given priority.

Challenges and planned action

In the long term, it is of crucial importance to Norway as a fishery nation that the marine environment is protected and managed sustainably. The fisheries authorities will endeavour to

ensure that all stages of the marine food chains, including benthic species, commercial and non-commercial species, seabirds and marine mammals, are taken into account in marine resource management. The further development of multi-species management towards an ecosystem approach will therefore be given high priority. This requires the expansion of species monitoring and the development of fisheries technology to devise fishing techniques that give greater protection to young fish and non-target species.

Internationally, Norway will attach importance to the implementation of regional agreements. For example, cooperation with the EU in the North Sea will be given priority, and we will urge the EU to introduce legislation preventing catches of young fish and fry and prohibiting dumping of bycatches. The work being done by the NEAFC and the NAFO will also be given high priority as a means of achieving better arrangements to ensure sustainable utilization of migratory fish stocks in the open sea in accordance with the UN agreement on high seas fisheries.

Even though the use of medicines by the aquaculture industry has been reduced to a relatively modest level, the goal is to reduce this still further. Greater efforts will also be made to develop fish medicines that do not have undesirable environmental effects, and an evaluation and approval scheme for such products is to be established by the year 2000. The amounts of other chemicals used in the industry are also to be reduced. The project for the development of a new system for modelling and monitoring fish farms has been followed up by full-scale tests at selected fish farms along the coast. The fisheries and environmental authorities are now considering how the results of the project can be implemented in the overall administration of the industry. In 1997, a stricter technical approval scheme is to be introduced for all new aquaculture facilities.

TRANSPORT

Existing goals

In 1994, the Ministry of Transport and Communications submitted its sectoral plan for transport and biological diversity, which stated that the main objective of the transport authorities is to ensure that our society’s long-term transport needs are as far as possible adjusted and met in accordance with the principle of sustainable development. In other words, importance will be attached to the ways in which transport activities have an impact on biological diversity. The report also includes the following goals for the transport sector:

- To ensure that the conservation of biological diversity is included as one of the basic premises in the planning, construction and operation of transport infrastructure.
- To ensure that subordinate agencies of the Ministry of Transport and Communications have a basic knowledge of environmental protection and nature conservation.
- To develop knowledge of how ecosystems are affected by various transport activities and if possible take measures to mitigate such effects.

These goals apply to road, rail and air transport, and the agencies involved are required to incorporate biological processes as a consideration from the very beginning of the planning process for new transport facilities. They are also required to make standardized approaches to

for scientific analyses as part of the process of environmental impact assessment prescribed by the Planning and Building Act. Even if no environmental impact assessment is required by the Planning and Building Act, thorough scientific analyses are required if a project is expected to affect vulnerable ecosystems. Guidelines for the protection of biological diversity should be drawn up as one element of the agencies' systems for long-term planning and result monitoring. The transport authorities have not as yet considered it to be appropriate to specify quantitative objectives for how conservation of biological diversity is to be weighed up against other considerations in connection with future investments in the transport sector.

Regional policy goals in Norway require an efficient road system serving large parts of the country. Norway's general character, with its rugged topography and low population density and the long distances between settlements, means that road and railway construction and operation are particularly costly. Today, the total length of public roads is about 90 000 km, and there are five main railway lines with branch lines, but most of the northern part of the country has no railways at all. Providing an extensive transport network may entail problems in relation to the conservation of biological diversity, both because it often involves large-scale disturbance of the environment and because alternative solutions with less environmental impact are frequently so costly that they become self-excluding. In addition, the growth in traffic is viewed as a major challenge in view of its substantial impact on biological diversity.

Experience and action since the Convention entered into force

Roads

The Public Roads Administration has produced two manuals for use by planners in the agency, one on roads and the environment in general, and the other on roads and the coastal zone. Both deal with the impact of environmental disturbance associated with roads and road traffic.

The framework for construction and maintenance of public roads in Norway is provided by the annual allocations in the state budget and the national road and road traffic plan, which covers a 10-year period. This is a rotating plan, which is revised at intervals so that projects for the next few years are ranked and the planning process for their implementation is completed. The plan for 1998-2007 includes a supplementary analysis of biological diversity, which has been jointly evaluated by the public road authorities and the nature management authorities. During this work, some road construction projects and alternative road alignments have been evaluated to involve serious adverse consequences for biological diversity. A particularly thorough assessment will be required if the implementation of these projects is proposed in the period 1998-2007. As a result, a new planning process has been started for several of the projects in this category (cf. environmental auditing under the heading "Challenges and planned action" in this chapter).

The public road authorities have also started preliminary and supplementary investigations of the existing road system to obtain documentation of the impact of road construction on the natural environment. These studies will provide the basis for evaluating measures to mitigate the impact of road construction. The Public Roads Administration has registered problem zones where environmental conditions and road safety standards are unsatisfactory. In parallel with the planning and construction of new roads, environmental measures are being carried

out along existing stretches of road. This is being done in cooperation with the environmental authorities as part of packages of measures intended to reduce overall environmental problems.

Railways

The railway authorities in Norway have produced guidelines on environmental objectives for railway planning, construction, operation and maintenance. Guidelines for surveying the environmental impact of railways have also been published, and an environmental management system is being prepared which will be used as a basis for revising objectives and monitoring results.

Environmental monitoring programmes are to be drawn up for all railway construction projects, and have already been produced for three of five main railway lines. Biotopes have also been surveyed along parts of the existing railway network, and the results will be used in preparing management plans for areas close to railway tracks.

Extensive studies have been carried out at all railway creosote impregnation facilities, all of which are now closed, to determine the degree of pollution and study the effects of creosote on the flora and fauna. The results have been used to draw up plans for cleaning up sites contaminated by creosote. This work has been started, and has been completed at several sites. Monitoring at such sites will be continued to determine whether the fauna and flora gradually change and become more typical of unpolluted areas after the clean-up operations. Old railway installations that are no longer in use has also been removed to return areas to their original state.

A new high-speed railway line is being built in connection with the construction of the new national airport about 40 km from Oslo. Unexpected leaks to the tunnel through faults in the bedrock have resulted in substantial water losses from several small lakes. The environmental impact and the effects on an important recreational area of woodland just outside Oslo have aroused great political interest and strong public feeling, and the railway construction project will incur considerable extra costs in connection with measures to minimize the damage to the lakes and countryside. As a result, it is expected that the railway authorities will give greater priority to environmental considerations in future.

Aviation

The aviation authorities are currently taking steps to improve their general level of expertise as regards biological and environmental issues, and have started to draw up environmental action plans for each airport. The most important measures implemented thus far have been related to pollution and noise problems, but issues that have arisen in connection with the construction of the new national airport near Oslo have made clear the importance of measures related to biological diversity. The conflict between birds and aircraft has been a cause of concern at Fornebu Airport near Oslo, where there are two important bird reserves, one on each side of the main runway. This conflict will be resolved by the closure of Fornebu and the move to the new airport.

Challenges and planned action

Roads
The analysis of biological diversity in the national road and road traffic plan has been evaluated, and the results will be used as a basis for the development and improvement of methods and selection criteria for new analyses of biological diversity to be carried out for the next edition of the plan. The public road authorities wish to ensure that biological diversity concerns become one of the basic premises for the assessment and design of roads, not a consequence of a plan. This means that road alignments that cause less damage should be given higher priority, while those with a serious impact on biological diversity should be given substantially lower priority. From 1998 onwards, all new road construction projects are to be subject to environmental quality assurance, and if necessary the projects are to be revised in collaboration with the environmental authorities. Even if the environmental authorities do not initiate revision of a project, the public road authorities are required to raise the matter with the environmental authorities if the results of the quality assurance process indicate that the project should be further evaluated. Broader environmental expertise is to be developed in the public road authorities, focusing on the natural sciences, and cooperation with the environmental authorities is to be strengthened.

Railways
The railway authorities are to offer courses and training schemes for personnel responsible for environmental issues, planners and heads of projects. The aim is to improve expertise and clarify responsibilities so that impacts on biological diversity are taken properly into account in the planning and construction phases of projects. Personnel at management level will be required to attend training in environmental management as part of this programme.

The railway authorities are also to draw up two sets of guidelines, one of which will deal with quality control and environmental auditing of plans. This is intended to ensure that environmental considerations are taken into account in the planning and approval processes. The second will provide guidelines for preparing environmental follow-up programmes for all aspects of railway operations.

Aviation
Once construction of the new national airport is completed, the development programme for Norwegian airports will have been completed for the foreseeable future. Action to implement the Convention will therefore be almost entirely related to the operation of airports, each of which is required to have an environmental action plan.

DEFENCE

Existing goals

In recent years, the defence establishment has worked actively on environmental issues relating to both pollution and conservation problems. Report No. 46 (1989-89) to the Storting on environment and development was followed up by Report No. 21 (1992-93) to the Storting on an action plan for environmental protection in the armed forces. The latter discussed issues pertaining to environmental legislation and implementation of national environmental policies in defence activities, established an environmental policy for the armed forces and proposed a number of measures relating to the prevention of environmental problems, compliance with environmental legislation and requirements, clean-up of old environmental problems and

environmental assistance to civilian society. Close cooperation between the environmental and defence authorities at all levels is one of the tenets of the plan. The Ministry of Defence updates the plan periodically, and the revised plan is to be presented in the annual Defence Budget as the Strategy for Environmental Security. This was done for the first time in 1997. Environmental issues were also prominently featured in Report No. 22 (1997-98) on the principal guidelines for the development and activities of the armed forces for the period 1999-2002.

Environmental protection is a high-priority task in society today, and the defence establishment must take responsibility for this in its own sector. The activities the armed forces are required to carry out must be weighed against the environmental impacts. Environmental protection must be part of day-to-day planning at all levels in the armed forces.

To ensure that its environmental policy is implemented, the defence establishment has initiated the following activities :

- An overall evaluation will be made of the way the environment-related activities of the armed forces are organized. The objective is to make any necessary changes to the current rules and to adjust organizational solutions as necessary to improve the efficiency of such activities.
- Environmental management and audit systems are to be developed as central tools for further environment-related work and a reporting system will be developed to monitor and evaluate the results of any measures implemented.
- Environmental training programmes will be run for officers of all ranks and enlisted personnel.
- Programmes for environmentally sound management of training areas will be implemented, comprising revegetation programmes, clean-up operations, better control of fuelling stations, etc., all of which can contribute to a sound basis for sustainable development.
- Headquarters Defence Command Norway is to develop a strategy to reinforce the importance and profile of environmental issues in the defence establishment.
- Criteria for environmental quality are to be developed to reflect the carrying capacity of the environment and future user interests.
- The environmental impact of defence activities will be surveyed and used as a basis for monitoring the long-term impact of the armed forces on natural resources and cultural monuments.
- Investigations of landfills are to be continued, and clean-up operations will be carried out.
- The defence establishment will develop bilateral and multilateral programmes for defence-related environmental cooperation with other nations.

Experience and action since the Convention entered into force

In 1994, the Ministry of Defence drew up a sectoral plan for the conservation of biological diversity within its sphere of responsibility. The plan included a status report and a discussion of the future management of defence establishment properties, shooting ranges and training areas. In the same year, officers responsible for environmental protection were appointed in all independently administered units of the armed forces, and many officers were given special training for their duties.

In 1995-1996, multiple-use planning systems for shooting ranges and training areas were developed. This project was continued and the results were implemented in 1997.

In the same period, ways of reducing the environmental impact of military exercises has also been reviewed. These measures are intended to ensure that environmental considerations are taken into account during national and international military exercises in Norway. A plan for conservation of biological diversity on shooting ranges and training areas, using a specific shooting range as a test case, was completed by the end of 1997. Two joint projects have been started as part of Nordic environmental cooperation, one on an environmental management system and one on planning and running large military exercises.

Revegetation projects have been carried out in some training areas for the armed forces. This programme will be continued in the next few years, and will be expanded to cover other areas. Operations to clean-up and remove spent ammunition will also be continued.

A project run in cooperation with the environmental authorities is reviewing the need to make provision for conservation and recreational interests and the preservation of cultural monuments on properties that are to be disposed of when military activities cease.

The Coast Guard is part of the defence establishment and has been assigned wider control and inspection duties in recent years, as regards ecologically sound management of fish stocks and environmental inspection in various fields.

The armed forces have implemented a number of measures to combat pollution, including phasing out the use of CFCs, improving waste water treatment, surveying and cleaning up landfills for hazardous waste, and measures in the field of cultural conservation, including protection plans for historical fortifications and surrounding areas.

The defence establishment has been planning a new integrated shooting range and training area in Eastern Norway as part of a rationalization and reorganization process. During the 1990s, a number of alternative areas in forest and mountain areas in and around the Østerdalen valley. this type of project generally involves a number of problems, since the primary goals of the defence establishment are likely to differ from those of environmental and local interests. As regards the Østerdalen project, the defence authorities have complied with the legislation governing environmental impact assessment and have cooperated very closely with the local and environmental authorities. Efforts to meet requirements for environmental impact assessment concerning biological diversity, the cultural heritage and local interests have been given priority. Regardless of the final outcome, the way the defence establishment has dealt with this project, both in taking part in cross-sectoral cooperation and in assuming responsibility for environmental impact assessment from the very beginning of the planning process, is an example to other sectors.

The Ministry of Defence has initiated a programme with the defence establishments in Russia and the USA called Arctic Military Environmental Cooperation (AMEC) . A working group has been appointed to evaluate problems caused by radioactive pollution from military activities. In addition, separate agreements on further cooperation on defence-related environmental issues have been signed with Russia and the USA.

Challenges and planned action

Military exercises are being reorganized along new lines involving more use of motor vehicles. This will increase the need for measures to prevent and mitigate damage during day-to-day military operations, including the use of new technology, better training in understanding and using the terrain, and a focus on environmental considerations in exercise planning and during training.

PETROLEUM AND ENERGY

Existing goals

Watercourse management and electricity supplies

Norway's river systems provide important natural resources and are used to generate renewable supplies of electricity that meet domestic consumption. However, hydropower developments have major environmental consequences and a serious impact on ecosystems and biological diversity both in and associated with river systems. Norway's goal is to find a balance between the use and conservation of river systems, by following a strategy involving plans and management systems in addition to acts of legislation. Three elements are of particular importance in cooperation between the water resources and environmental authorities:

- Hydropower development is only permitted after a licence has been granted. One of the most important factors in making a decision on whether to grant a licence is the process of weighing the socio-economic benefits and disadvantages of using a watercourse for electricity generation. In recent decades, environmental interests have played a central role in this process, and no decision is taken on an application for a licence before environmental impact assessment required by the environmental authorities has been completed. There is a great deal of public and media interest in all major hydropower development cases in Norway, and NGOs are frequently involved in these cases.

- The Master Plan for Water Resources includes an evaluation of the remaining undeveloped water resources of the country which may be of interest for hydropower purposes. The Master Plan is the administrative responsibility of the environmental authorities, and is drawn up in cooperation with the water resource authorities. It lists the watercourses where applications for licences may be considered in the next few years, and which will not be considered in the same period. Within each category, watercourses are ranked so that those that are of most interest for hydropower development and where the environmental impact of development or other damage will be least are to be considered first. Norway's total hydropower potential is about 177 TWh per year, of which about 115 Twh per year has been developed for electricity generation. The remaining development potential is about 15.2 TWh classified in category I in the Master Plan, and about 9 TWh per year that will currently not be considered for development in category II.

- The Protection Plan for Water Resources is administered by the water resources authorities and was drawn up in cooperation with the environmental authorities. It lists watercourses that are permanently protected against hydropower development because environmental considerations are considered to carry more weight than development interests. At present,

341 localities, which may be whole river systems or parts of them, with a hydropower potential of about 35 TWh per year, or about 20 per cent of Norway's total hydropower potential, are included in the plan. These are a very valuable resources, and the environmental authorities, with the cooperation and support of the water resources authorities, are taking steps to ensure that they are also protected against other types of development as far as possible.

Petroleum activities

During the past 30 years, oil and gas extraction from deposits under the North Sea and the Norwegian Sea has become an important industry in Norway. These are non-renewable resources, which are mainly exported, providing very important revenue for the country. The Act relating to petroleum activities sets out the principle that Norwegian petroleum resources shall be managed in a long-term perspective for the benefit of Norwegian society as a whole. This means that these resources must be managed in a way that in addition to providing revenue for the country, also contributes to welfare, employment and environmental improvement and strengthens the development of Norwegian business and industry. At the same time, due regard must be paid to regional policy considerations and other activities. One of Norway's goals is to be at the forefront of efforts to develop an environmentally-sound, cost-effective petroleum industry.

In Report No. 26 (1993-94) to the Storting on challenges and prospects for offshore petroleum activities, the industry was discussed in terms of its socio-economic and environmental impact. The consequences and environmental impact of opening new areas of the continental shelf for exploration activities were also discussed. The Storting laid down a number of restrictions on exploration activities, based on the environmental impact assessments (EIAs) that had been carried out for the Skagerrak and the Norwegian Sea, and also refrained from opening large areas of the two seas.

Report No. 58 (1996-97) to the Storting on an environmental policy for sustainable development defines objectives for the petroleum sector.

Reorganization of the public oil pollution emergency services should be completed by about the end of the century, and it is expected that central goals will be achieved without any substantial changes in the use of policy instruments. However, it will be considered increasingly important to coordinate the use of resources and to cooperate with other parties involved in the emergency response system and to focus on the efficiency of oil pollution emergency services in northern waters.

The existing goals relating to operational discharges from petroleum activities have largely been achieved. However, discharges of oil in produced water are now rising, as is the level of activity in environmentally sensitive areas, and current technological solutions do not remove the most problematical components from discharges, and this together with projected trends shows that new issues relating to such discharges will have to be dealt with. The Government will ensure that environmentally-hazardous discharges of oil and chemicals to water are further reduced.

When new deposits are found and developed independently of earlier projects, the objective is to ensure that as a general rule, no environmentally-hazardous discharges are permitted (zero discharges).

Experience and action since the Convention entered into force

Watercourse management and electricity supplies

In their sectoral plan, the water resources authorities described how biological diversity and other environmental issues have been given increasing weight in connection with both hydropower projects and other related developments, such as the construction of power lines, in recent years. However, since the sectoral plans were completed, the power market has changed radically, and export and exchange agreements with other countries, growth in domestic electricity consumption and government policies concerning greenhouse gases and the CO_2 budget have resulted in renewed interest in hydropower developments. Parts of Norway suffered severe flooding in 1995 and very dry conditions in 1996, thus focusing more attention on the issues of trends in the demand for power and various means of meeting or moderating this. In 1997, a committee was appointed to review for the period up to the year 2020, and is expected to submit a report in spring 1998. Its conclusions and the policy subsequently pursued will be of great importance for the conservation of biological diversity after the turn of the century.

National Policy Guidelines were been adopted to safeguard permanently protected river systems against development for purposes other than hydropower production, and entered into force at the end of 1994. On the basis of these, the water resources and environmental authorities together have drawn up more detailed guidelines for municipal land-use management. These apply both to the planning of watercourse management regimes and to developments in protected river systems that are dealt with pursuant to the legislation governing river systems. Protected rivers are classified according to their conservation value, land use and development status, and this is to be used as a basis for subsequent management decisions. An information campaign has also been started to provide municipalities and others responsible for making decisions that may affect protected river systems with adequate knowledge of their value.

The water resources authorities have not initiated research directly concerned with biological diversity during the period covered by this report, but research on issues specifically relevant to general watercourse management is also relevant to biological diversity issues. A major research programme on the impacts of various types of development on the hydrology and limnology of river systems has been started, and will provide important environmental data and information that can be used in environmental impact assessment.

Petroleum activities

During the period covered by this report, the Storting decided, on the basis of the EIAs mentioned in the section on “Existing goals”, to introduce restrictions on exploration activities and not to open up large areas of the Skagerrak and areas near the coast of central and northern Norway (from Sør-Trøndelag to Troms).

The Ministry of Petroleum and Energy has initiated a research and development programme called “Fish, oil and oil pollution contingency planning”. The Ministry of Fisheries, the Ministry of the Environment and the Ministry of Petroleum and Energy have appointed a working group on biomonitoring, the long-term effects of oil and chemicals and produced water. A report on the use and effects of chemicals in prospective exploration drilling in the Skagerrak has been produced. Furthermore, five studies have been carried out to identify the effects of possible exploration activities in the Skagerrak on the west coast of Sweden, and a report summarizing the results has been produced for the Swedish authorities.

The Norwegian Oil Industry Association has carried out an environmental programme on emissions to air and water from upstream petroleum activities. One of its objectives was to clarify the relationships between reductions in emissions and costs. The programme is being continued in a formalized cooperation with the Ministry of Petroleum and Energy and the Ministry of the Environment.

Challenges and planned action

Watercourse management and electricity supplies

Apart from the continuation of current management regimes and activities, the most important work in progress is the preparation of a new Act relating to Watercourses and Ground Water (Water Resources Act). This is intended to introduce new rules that will provide better protection for the environment and biological diversity. The proposals include provisions to prevent environmental degradation caused by various types of development in rivers that are of permanently protected against hydropower development. These will protect the flora and fauna and provide legal authority for permanent protection of river systems. The new act will also apply to other measures relevant to the conservation of biological diversity, for instance the conservation of riparian vegetation, ponds and small water channels.

Petroleum activities

Until now, the operating companies have monitored the environmental impact of petroleum activities on the Norwegian continental shelf, and areas immediately surrounding the installations have been monitored. The results have been reported annually. The focus has gradually moved from the seafloor to the water masses, and the environmental authorities therefore revised the monitoring manual in 1996. The new guidelines require monitoring to continue around the installations, but the number of measuring stations has been reduced. A network of new stations is planned in the sea between installations. Thus, the plans include monitoring of the water masses across the whole of the Norwegian shelf, using a fixed grid of stations where the oil and chemical content of fish and plankton will be monitored.

The Government also considers it important to ensure that discharges to water of oil and environmentally hazardous chemicals are further reduced in the next few years. As a general rule, when new petroleum deposits are found on the Norwegian shelf and such fields are developed independently of earlier projects, no environmentally hazardous discharges will be permitted. In other words, the principle of zero discharges is to be introduced at sea.

Discharges to water from existing fields will be carefully reviewed and zero-discharge solutions will be introduced where this is practicable. This review is to be completed in about

2000 and measures are to be implemented by 2005. Discharges from exploration activities and pre-drilling are also to be limited, but it will not be possible to extend the zero-discharge principle to these activities.

Environmental impact assessments have been required for both onshore and offshore petroleum activities since 1985, pursuant to the legislation then in force. The requirements relating to EIAs have been continued in the new Act of 29 November 1996 relating to petroleum activities and appurtenant regulations. The Act includes provisions requiring EIAs as part of the basis for decision-making for several aspects of petroleum activities: before an area is opened for petroleum extraction, for field development and installation and operation of facilities, and for decommissioning and disposing of facilities when petroleum activities have ceased.

TRADE AND INDUSTRY

In Norway, industry, trade and tourism are the sphere of responsibility of the Ministry of Trade and Industry. One of the Ministry's main objectives is to prevent environmental problems in trade and industry as effectively as possible, in accordance with the principle of sustainable development, by

- contributing to policies and use of natural resources that reconcile environmental and business interests
- contributing to the development of environmentally-friendly technology
- working actively in international organizations to reduce the environmental impact of trade and industry.

The Ministry of Trade and Industry, in cooperation with the environmental authorities and the industrial sector, has made a major contribution to the reduction of environmental pressures related to pollution. These measures are of clear benefit to the natural environment and biological diversity. The main policy instrument in this field is, as mentioned earlier, the Pollution Control Act, which is administered by the environmental authorities. Some important industry-related results are as follows: from 1989 to 1995, total process emissions of greenhouse gases measured as CO_2 equivalents were reduced by about 40 per cent in a period when industrial production rose by about 12 per cent. Emissions of SO_2 from industrial processes have been reduced by about 68 per cent from 1980 to 1995, and industrial emissions of the most hazardous substances to air and water were reduced by 80-100 per cent in the ten years up to 1995. The latter cuts have considerably improved environmental conditions in a number of fjords and river systems. Industrial discharges of nutrients (nitrogen and phosphorus) have also been substantially reduced, and now account for only 3-4 per cent of total inputs to primary recipients in Norway.

Since 1989, the mining authorities have taken a number of steps to reduce or eliminate runoff of pollution containing heavy metals from abandoned mines. Such measures have been completed with satisfactory results in some areas, and the work will be continued in other areas.

The Ministry's efforts to combat pollution also include a number of initiatives for research and technological development to help solve environmental problems. Similar efforts are being made to find cleaner production strategies and more environmentally-friendly products and processes. This strategy recognizes the increasing importance of environmental quality

and environmental standards as international competitive factors for both companies and products.

Industrial activities also involve building and construction, and are an important land-use factor. Land use is governed by the Planning and Building Act, which is primarily applied by the municipalities, and by the rules set out in the Act and appurtenant regulations concerning environmental impact assessment. Land use for industrial installations and tourist facilities can entail problems related to the environment, ecosystems and biological diversity. Two main types of land-use conflict that have arisen relatively often in Norway involve land reclamation in connection with the establishment of industry in coastal or wetland areas or along rivers, and the construction of tourist facilities outside already built-up areas. However, during recent decades, municipalities, business and industry and the central authorities have become much more aware of these issues, and have more knowledge and better decision-making processes at their disposal. This ensures a better balance between the various interests that must be taken into consideration.

Access to attractive natural and cultural landscapes is the most important basis for the tourist industry in Norway. Cooperation between the industry and the environmental authorities has been strengthened in the period covered by this report, and various initiatives have been taken to counteract the pressure and wear and tear growing numbers of tourists inflicts on attractive countryside. This cooperation has been generally satisfactory, although conflicts of interest arise from time to time. In the next few years, the emphasis will be on further development of cooperation, based on the industry's own objective of active adaptation to the environment.

EDUCATION AND RESEARCH

Education

The Ministry of Education, Research and Church Affairs is responsible for the administration of legislation and policy instruments for the entire education and research sector in Norway, and it therefore holds a central position as regards knowledge and awareness of biological diversity and general environmental issues.

The general part of the 1993 Core Curriculum for primary and secondary education in Norway sets out the following goal: "interactions between the economy, ecology and technology impose particular scientific and ethical demands on our times if we are to ensure sustainable development. Education must therefore provide a broad understanding of the interconnections that exist in nature itself and of interactions between humans and the natural environment."

Measures have been taken to achieve this goal in primary and secondary schools by including biological diversity as a topic in environmental studies at all levels. Textbooks dealing with species and ecosystems have also been produced. A nationwide network, the Norwegian environmental education programme, is being developed in cooperation with other ministries. Pupils are invited to investigate and monitor biological diversity themselves. The programmes provide scientific and methodological support for teaching of environmental studies in schools, and include the compilation of information in databases. For example, several hundred schools are taking part in the Aquatic Programme (see the box below). Their pupils have investigated fresh water bodies and reported their results to a central database, where more than 1000 species have now been registered. The results include the first records of some species in Norway, finds of species that had not previously been scientifically described,

records of rare species at new localities and records showing the spread of species to new localities. In another programme, Coastwatch, pupils are asked to monitor stretches of coastline, and have already shown that the introduced seaweed *Sargassum muticum* has a much wider distribution than scientists had realized.

Box 7 The Aquatic Programme

The Aquatic Programme is open to schools at all levels, voluntary organizations and others who wish to study aquatic habitats. Participants investigate a stretch of coastline, stream, river or lake. Information from all localities is collected in a database, which is open to the public on the Internet. Data sent in to the network are reviewed by experts. The participants can obtain help from experts by letter, telephone or through the electronic meeting place.

There are instructions on how to investigate physical and chemical parameters and the biology (biological diversity) of aquatic environments, and how to investigate the impact of disturbance or pollution on biological diversity. By investigating who uses an area and any conflicts between different categories of users, participants can gain insight into how biological diversity is affected by user groups. Participants are encouraged to cooperate with the local environmental authorities, and to suggest ways of solving conflicts and of conserving rivers or stretches of coastline or improving environmental conditions there. The programme encourages active participation by schools and other local groups so that become aware of the value of biological diversity and gain an understanding of how our use of natural habitats affects biological diversity and what can be done to prevent its loss.

The material includes guidelines and forms for recording data from studies of streams, rivers and lakes, and background material on biological diversity, land use, the cultural heritage and sustainable production and consumption. The background material and guidelines were drawn up by scientists and other specialists from research institutions and the public administration. Guidelines and forms can be found at the programme's website (*http://vann.zoo.uib.no*) and downloaded directly.

A plan for further improving the competence of teachers in primary and lower secondary schools in environmental studies was implemented for the period 1994-1998. This has strengthened the position of the subject, which has been given priority in the new curriculum from 1997. A wide range of courses in ecology and environmental studies has been developed for adult education schemes, and biological diversity is an important element in these. These include both general and vocational courses and advanced courses.

In addition to the work on biological diversity being carried out by the four universities (especially at the faculties of mathematics and natural sciences) and institutes at the Norwegian University of Agriculture, these institutions have also established centres for environment and development, and studies of biological diversity are an important element of their activities. All the universities also offer various courses and carry out a great deal of research which is helping to ensure constant progress as regards expertise, scientific data, training and information related to biological diversity. Much work is being done on issues of current interest such as management of biological diversity and natural resources. In addition, the Institute of Marine Research carries out research on biological diversity which is relevant to the management of natural resources.

In addition to the universities, Norway has a large number of colleges in the further education sector. Several of the state-funded colleges have focused on specialized studies in biology,

outdoor recreation, forestry, resource management, etc. biological diversity is an important element of such studies and also important in research-related activities. Often the emphasis is on the region where the college is situated.

Museums

The identification of species, ecosystems and biological processes is an essential basis for practical work related to biological diversity. The natural history museums are part of the universities, and their work is on the borderline between basic and applied research. One of their important functions is to supply information on biological diversity to the authorities and the public. In order to strengthen this element of the museums' activities, taxonomy has been given priority by the universities, partly by the provision of funds from the Research Council of Norway.

The Research Council of Norway

The Research Council of Norway is an important intermediary between the scientific community and the government. Recognizing that more knowledge of biological diversity and threats to biological diversity is essential for the conservation and sustainable use of biological diversity, the Research Council has given high priority to research in this field. The budget for such research has been about NOK 40 million per year in the period from 1993 to 1997. The funds have been used for 13 major research programmes, three of which were completed in 1997. One new programme is being started for the period 1998-2007, so that the funding allocated to this field will be lower in 1998 than in recent years.

Developments in research on biological diversity since 1993 can be illustrated by the following:

- The Research Programme on Conservation of Biological Diversity started in 1992 and was concluded in 1997. Its was an interdisciplinary programme whose purpose was to contribute to the conservation of biodiversity through research, and to organise and utilise existing knowledge, to describe the diversity, document the importance of biodiversity, assess the threats to biodiversity and propose scientifically-based action plans for the conservation of biodiversity in the short and long term both in Norway and in the rest of the world. Its three main elements were taxonomy and documentation of biological diversity, conservation biology, and management of biodiversity, and it included 40 separate projects. Its budget was about NOK 3-4 million per year.
- A report on a strategic plan for Norwegian environment and development research was published in 1996. This identified gaps in our knowledge and topics where research is needed both nationally and internationally. The report identified biological diversity as a priority area, and particularly the following: taxonomy in Norway and in developing countries, the impact of threats to biological diversity, particularly the introduction of alien species and genotypes, and socio-economic causes of threats to biological diversity and measures to counteract these.

A research programme called "Biological diversity - dynamics, threats and management" is being planned for 1998-2007, and will consist of four main elements. These are: the composition, functions and dynamics of biological diversity, the impact of impoverishment of biological diversity, the introduction of alien species and genotypes, and management of biological diversity.

ACTIVITIES AT LOCAL LEVEL

Existing goals

The national goals set by the Government and described earlier also provide guidelines for the municipalities, and have been elaborated in a separate publication for the municipalities that gives examples of ways of achieving the goals in practice. Most municipalities have set their own local goals.

Experience and action since the Convention entered into force

The municipalities have the primary responsibility for land use planning in Norway, and in recent years much of the authority for natural resource management has also been delegated to them by the central authorities, e.g. legal authority pursuant to the Wildlife Act, the Act relating to salmonids and fresh-water fish, and agricultural legislation. Built-up areas, roads and agricultural areas account for only a small percentage of the total area of the country. The municipal master plans that have been adopted classify 90 per cent of all land in Norway as outfields. Given that that management of total biological diversity to maintain as many species, populations and habitats as possible, will be highly dependent on land use, it is clear that the municipalities have a key role to play in the conservation of biological diversity in Norway.

Together with the Norwegian Association of Local and Regional Authorities, the environmental authorities ran a local environmental development programme from 1991-1996. Through the programme, all municipalities were allocated funds over the state budget to appoint coordinators for environmental affairs. In addition to state funding totalling about NOK 700 million, the programme received substantial funds and other contributions from the municipalities themselves. The main purposes of the programme were to integrate environmental protection, and particularly nature management into municipal activities, to build up expertise, and to develop municipal environment and natural resource planning.

The success of the programme can be illustrated by the fact that in 1996, 420 of the country's 435 municipalities had appointed coordinators for environmental affairs, most of whom are highly qualified and have an organizational position, in both political and administrative terms, which reflects the high priority given to this sector. The results have also been evaluated, and were favourable in new areas such as biological diversity, the cultural heritage and separation of waste at source as well as traditional areas such as water supplies, waste water treatment and the management of natural resources. During the programme, environmental protection and planning have been integrated into the ordinary administration system in most municipalities.

The reform process introduced by the programme was concluded in 1997, and the annual funds from the state now form part of the municipalities' normal revenues. Special development projects formed part of the programme and 35 municipalities took part in these, which covered topics such as biological diversity, systems for reporting on environmental status at municipal level and the sustainable urban development programme. These have been completed and the results provide models for other municipalities to adapt and use.

Challenges and planned action

The need to take into consideration the resource base for biological production and the conservation of biological diversity has introduced new challenges into the municipal planning process. Planners and decision-makers must take into account both the overall effect of environmental disturbance and the need to find a path of development that is sustainable in both socio-economic and ecological terms. This requires adequate knowledge, particularly when making decisions on whether to protect or use areas. To provide a better basis for decision-making, a five-year nationwide programme involving the central and local authorities is planned, which will deal with methods of surveying, valuing and monitoring biological diversity of outfield areas in the municipalities. (*cf p. ?*)** The results will be used as a land use planning tool in the municipalities. A system for ranking municipal areas according to the value of their biological diversity should also be an advantage to the various user groups, because they will be able to find out what conditions apply to use of the natural environment before activities are started, and can evaluate alternative solutions that may reduce or eliminate possible conflicts between their activities and environmental interests.

To strengthen cooperation between the state and the municipalities to achieve the national goals, a system for coordination of result monitoring at municipal and national level is to be further developed. One issue that will be considered is adjustment of the distribution of authority in future.

Work on local Agenda 21s (LA21) has been in progress for some time in some municipalities, and the work has been centrally coordinated since 1997. In Norway, these efforts will be a natural continuation and expansion of the reform begun with the local environmental development programme. The challenges facing us in this field will be the further development of local commitment to environmental protection, planning with a time-frame of several generations, sustainable production and consumption, improvement of the quality of life, and, particularly important, ensuring that there is broad-based public involvement in all these issues, including individual people, organizations and private companies.

THE SAMI PEOPLE

The Sami are an indigenous people and a minority of the Norwegian population, with their own traditions as regards the use of natural resources, their own culture and their own language. They have their own elected body, the Sami Assembly, which first met in 1989, and was established pursuant to Article 110a of the Constitution and the Act of 12 June 1987 relating to the Sami Assembly and other Sami legal matters.

The Sami Assembly maintains that it must be a primary objective to preserve biological diversity for future generations, and it considers biological diversity to be of fundamental importance in maintaining and safeguarding the continued existence of indigenous peoples both in Norway and in other parts of the world. Natural resources in areas settled by the Sami people provide the material basis for Sami culture and lifestyles, and help to maintain local communities in Sami areas.

The Sami Assembly considers it important that the implementation of the Convention on biological diversity is viewed in the light of the developments that have taken place in international law relating to indigenous peoples in recent decades. This applies particularly to ILO Convention No. 169, the Indigenous and Tribal Peoples Convention, and to Article 27 of the 1966 International Covenant on Civil and Political Rights.

The Sami Assembly stresses most strongly the importance of establishing statutory provisions, both nationally and internationally, which prevent others from being able to take out patents on the genes of indigenous peoples or on biological resources and products in areas native to indigenous peoples. Control over and management of one's own genes and genetic resources is a natural part of indigenous peoples' right of self-determination.

Last year, an official report on the natural resource base for the Sami culture (NOU 1997:4) was submitted and circulated for comment. The report is based on a comprehensive review, and discusses the future role of the Sami Assembly in resource management and land use planning, and rights to land and water. The time limit for comments to the report is spring 1999.

The Sami Assembly considers an environmental perspective to be the fundamental basis of all socio-economic activity, and believes it is essential that government policy for socio-economic development in Sami areas is based on long-term considerations to ensure that the use of natural resources does not exceed the carrying capacity of the environment. The pressure on natural resources in Sami areas is growing, and it is of crucial importance that developments do not cause any significant environmental degradation or reduce biological diversity. Impoverishment of biological diversity would have consequences for Sami means of livelihood, which are based on a healthy natural environment, and thus on Sami culture and society.

The Sami Assembly will, in cooperation with its sister organizations in Sweden and Finland, draw up an environmental programme for Sâpmi (the Sami areas of Norway, Sweden and Finland) to safeguard the natural resource base in areas of Sami settlement. The Sami Assembly has expressed a clear desire to play a decisive role in fundamental issues concerning the environment and Sami culture and livelihoods, and to contribute to the controlled development of management regimes that respect an environmental perspective based on fundamental Sami philosophy, in which the environment and the availability of resources set the limits for what may be used and harvested.

Sami settlements and traditional lifestyles are to be found in one third of Norway's counties. There are several groups of Sami, whose language, culture and traditional means of livelihood vary. Nevertheless, a general feature is that fishing, agriculture, reindeer husbandry and other use of outfield areas are important, often based on small units which combine several activities. This results in some conflicts of interest between Sami settlements and other sectors of society related to the use of natural resources.

Only a minority of the Sami people are involved in reindeer husbandry today, but this is an important way of life and closely bound up with the Sami culture. The Sami Assembly points to two main factors related to the natural resource base that create problems for reindeer husbandry, i.e. overgrazing in Finnmark and losses of reindeer to predators.

The Sami Assembly emphasises that it is necessary to obtain information on the grazing resources available and to adjust the number of reindeer to a sustainable level. A project entitled “Eco-data Finnmark” has been started to monitor and survey biological and botanical conditions in the county, which is an important Sami area. This should be followed up by other similar projects to give the best possible basis for an evaluation of these issues. Given the nature of traditional Sami use of the environment and natural resources, the Sami Assembly considers that problems may arise in connection with a management regime determined by the central authorities and including elements such as growing populations of carnivores and the establishment of national parks and wetland and coniferous forest reserves in areas of Sami settlement. The Sami Assembly has therefore stated that Norwegian implementation of Article 8j of the Convention on biological diversity must not come into conflict with traditional Sami interests.

In the next few years, issues concerning natural resources as the material base for the Sami culture and way of life are expected to be of central importance in the political debate. This will be closely related to the comments received on the above-mentioned report on rights to land and water and resource management in Sami areas. Decisions made on the basis of the report and the public consultation process will be crucial to future management practices and conservation of biological diversity in Sami areas.

DEVELOPMENT COOPERATION AND OTHER INTERNATIONAL WORK

Existing goals and activities

Implementation of the Convention

A number of the challenges related to safeguarding valuable biological diversity and reducing losses of biological diversity are of supranational character and therefore require binding international co-operation. The Government considers it very important to further develop the Convention on biological diversity and other relevant global and regional agreements and to take practical steps for their implementation. These matters are discussed earlier in the report (see box 1).

Multilateral development cooperation

Norway is involved in development cooperation with a number of multilateral organizations concerned with natural resource management. The most important in the context of conservation of biological diversity are the development banks, the UNDP, the FAO and the CGIAR institutes. Cooperation with UNESCO in this field has also been discussed.

Norway can have an influence on these multilateral organizations through membership of their governing bodies, cooperation with other member countries, cofinancing of projects and direct support for various measures.

Norwegian members of the governing bodies of the World Bank and the UN system have pointed out the necessity for a holistic approach including sustainable and environmentally-friendly development as an integral element. Norwegian multilateral aid, including financing of multi-bilateral projects , is one tool that can be used to exert an influence in the right direction.

Norwegian aid granted through multilateral organizations for the purpose of implementing the Convention on biological diversity is concentrated mainly on the organizations where the greatest effect is expected. Support is therefore given to the organizations with most influence or that have a catalytic function. Support granted through international organizations is intended to have a catalytic effect on growth of the recipient countries' capacity and willingness to integrate biodiversity concerns into their development efforts.

Norway has provided financial support for the World Bank's work on environmental impact assessment and for the efforts of the African Development Bank to draw up environmental profiles for African countries.

Important negotiations are taking place in the FAO on plant and farm animal genetic resources. Agreement has been reached on a Global Plan of Action on plant genetic resources for food and agriculture, which will be associated in some way with the Convention on biological diversity. Norway has supported the negotiations and is working with the FAO on development cooperation programmes specifically dealing with biological diversity in agricultural systems. Norway has played an active role in negotiations within the FAO, and in 1997, joined a Nordic request to the governing bodies of the organization to give priority to this work.

Norway has contributed NOK 220 million to the GEF for work on the protection of biological diversity, which is one of the four focal areas of activity of the GEF. Norway advocates maintaining and strengthening the Fund on the basis of an agreed scale of payments that reflects the contributors' ability to pay.

Bilateral development cooperation

A central element of Norwegian development assistance policy both before and after the entry into force of the Convention on biological diversity has been support for sustainable natural resource management in our partner countries. The importance of contributing to conservation and sustainable use of biological diversity was emphasised in Report No. 19 (1995-96) to the Storting on the main elements of Norwegian policy towards developing countries and subsequently amplified in the report *A Strategy for Environment in Development Cooperation* (1997). Thus, Norway has for many years used development assistance to support measures that have a positive effect on nature management and biological diversity in recipient countries, but it is only more recently that there has been greater awareness that such measures are in fact relevant to and can be viewed as steps in the implementation of the Convention on biological diversity.

Agreements on biological diversity

Norway has also ratified the following conventions focusing on the conservation of various elements of biological diversity:

- The Bern Convention on the conservation of European wildlife and natural habitats. The Convention gives particular emphasis to the protection of endangered and vulnerable species.
- The Ramsar Convention on wetlands of international importance, especially as waterfowl habitat.

- The Bonn Convention on the conservation of migratory species of wild animals. Several associated regional agreements have been adopted. In Europe, there are agreements applying to small cetaceans, waterfowl and bats.
- The Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- The UN Convention for the Protection of the World Cultural and Natural Heritage (the UNESCO Convention), which requires member states to identify and protect their natural and cultural heritage and ensure that it is passed on to future generations.
- The Convention for the conservation of salmon in the North Atlantic (NASCO), which is intended to contribute to the conservation, restoration, enhancement and rational management of salmon stocks.
- The OSPAR (Oslo and Paris) Conventions for the protection of the marine environment of the Northeast Atlantic.

Norway is taking part in efforts to develop the Arctic Environment Protection Strategy (AEPS) under the auspices of the Arctic Council, together with the other seven Arctic states. The CAFF (Conservation of Arctic Flora and Fauna) and AMAP (Arctic Monitoring and Assessment Programme) programmes are both important in this connection. Monitoring pollution and climate change will be a central element of AMAP's future work, while threats to and monitoring of biological diversity in the Arctic are now being given priority within the CAFF programme.

Norway has also signed a agreement on an environmental cooperation programme in the Barents region.

There is close bilateral cooperation between Norway and Russia on environmental issues. A new Norwegian-Russian working group for biological diversity was established in 1997. Topics that will be given priority for the time being are protection of areas, species protection, sustainable use and sectoral integration, monitoring and local cooperation.

In addition, Norway is involved in environmental cooperation with Eastern European countries, particularly with Lithuania and Latvia in the field of biological diversity. For example, the environmental authorities in Latvia have made a national study of biological diversity in cooperation with Norway, and a similar project has been proposed for Lithuania.

A national study on biological diversity has also been carried out in Indonesia within the framework of its environmental cooperation agreement with Norway.

Experience and action since the Convention entered into force
Measures under the Convention on biological diversity

Norway played an active role in efforts to improve the scientific basis for implementing decisions under the Convention. This has been done by arranging two international conferences in Trondheim, the first in 1993 on biological diversity and the second in 1996 on Alien Species. In addition, Norway arranged a workshop on biodiversity in inland waters in June 1997 together with Sweden and some developing and Eastern European countries. The results from the workshop will be used in developing the work programme on freshwater biodiversity under the Convention on biological diversity. Norway will continue to contribute

to the scientific work of the Convention on biological diversity by helping developing countries and Eastern European countries to participate.

Norway has participated actively in negotiations on a biosafety protocol by providing legal texts for a protocol. Norway will also explore the possibility of including capacity-building in biosafety as an element of Norwegian development cooperation.

Bilateral development cooperation

Norwegian bilateral and regional development cooperation includes a number of projects and programmes that are either directly concerned with conservation and sustainable use of biological diversity or which include them as an important component of the work.

The Norwegian Agency for Development Cooperation (NORAD) has provided financial support to enable delegates from developing countries to attend meetings of the Conference of the Parties (COP) and for regional and national meetings in developing countries, particularly in southern Africa. This support is intended to strengthen implementation of the Convention in these countries. In accordance with Norwegian policy as regards recipient responsibility, support has also been provided for research, capacity-building and improving institutional capacity relevant to biological diversity in our partner countries. Our experience is that this helps to raise awareness of the importance of biological diversity in these countries, and has made an important contribution to their efforts to develop national action plans for biological diversity.

NORAD uses bilateral development assistance to support measures specifically dealing with sustainable natural resource management in many countries, particularly Tanzania, Zimbabwe, Zambia, Uganda, Namibia, Angola, Mozambique, Botswana, South Africa, Sri Lanka, Nepal, Bangladesh, Indonesia, Nicaragua and Costa Rica. Assistance in the fisheries sector in countries in southern Africa deserves special mention: measures include surveys of fish stocks, research, development of legislation, arrangements for determining quotas and the establishment of fisheries inspection systems, all of which are important elements of sound resource utilization. Use of the research vessel *Dr Fridtjof Nansen* and cooperation between Norwegian experts and institutions in the recipient countries has given very satisfactory results. The FAO has, with support from NORAD, used *Dr Fridtjof Nansen* for natural resource monitoring along the coast of northwestern Africa.

In Costa Rica, NORAD has assisted the national institute for biodiversity (INBIO) in surveying the country's natural resources. We have found that support for INBIO's work has helped to focus attention on the value of biological diversity and on the fact that this diversity can be a means of promoting balanced economic development.

In most countries in the South, biomass plays a central role in energy supplies. Since 1989, NORAD has been supporting a project to survey and map forest resources in Uganda, with the aim of ensuring effective and sustainable use of the country's natural resources. A combination of advanced technology and traditional vegetation studies has been used to prepare maps of the distribution of the forest in the country. Uganda thus has a unique opportunity to monitor the development of these resources.

Since 1986, NORAD has been providing support for Zambia's efforts to protect some of the variety of its natural environment. This has focused especially on the active involvement of the local population in the management of a national park where poaching used to be a serious problem. By ensuring that the local people receive some of the proceeds from sales of hunting quotas for animals outside the park and a share of the income generated by the park, it has been possible to reverse their negative attitude to the park. It is now in their own interest to support efforts to conserve biological diversity in the area. Experience from Zambia and other countries with valuable biological resources shows that it is essential to ensure that local people are aware of how they can benefit from their conservation. In many countries, natural resources outside protected areas are also under great pressure. This is true, for example, in the lowlands of Nepal, where the King Mahendra Trust for Nature Conservation in cooperation with the Norwegian University of Agriculture. The project is being carried out near a national park which both the Nepalese authorities and the international community wish to protect, and its aim is to ensure that the local population has the necessary natural resource base for a decent life without gradually being forced to impoverish the resources of the national park. The project is focusing particularly on involving the local people so that they can gradually take over responsibility for the project. The results so far are positive and show that with some support, negative developments can be reversed.

In Zimbabwe, another programme involving cooperation between the authorities and the local people to improve natural resource management is in progress. It is called CAMPFIRE (Communal Areas Management Programme for Indigenous Resources). Its purpose is to make local communities responsible for game management in their territory and to ensure that they receive the income from hunting and tourism regulated according to ecological principles. Through the WWF, NORAD is supporting one of the activities under CAMPFIRE, whose purpose is to assist the local population with administration of revenues for the benefit of the whole community.

As part of its regional development cooperation, Norway has for some years been supporting the SADC gene bank for agricultural plant genetic resources, and also several smaller projects involving both plant and animal genetic resources, mainly via NGOs. Our experience suggests that the most successful projects are those which involve local farmers actively in surveys of genetic resources and breeding programmes. Examples include the Southeast Asia Regional Institute for Community Education (SEARICE) and a model project for sustainable agriculture in the state of Acre in Brazil.

Box 8 The Sahel-Sudan-Ethiopia programme

The Sahel-Sudan-Ethiopia Programme (SSE Programme) is a major programme involving a number of Norwegian and international organizations, and includes activities that are directly relevant to the Convention. The projects in the programme are based on the principle that the development of agricultural and natural resource management systems that prevent hunger and improve food security will also help to conserve biological diversity. Activities within the SSE Programme that are particularly relevant to the Convention include the development of local management systems, awareness-raising regarding environmental issues, and discussions on the use of new technology, new plant varieties and therefore new cultivation techniques in agriculture. During the past five years, the programme has received support from the Centre for International Environment and Development Studies (Noragric) at the Norwegian University of Agriculture, which has been carrying out a kind of formative process research. This work has involved documenting local knowledge and advising local and Norwegian participants in the projects, thereby supporting the activities in the programme. An

important aim has been to ensure that the pastoral lifestyle can be maintained on the nomads' own premises in accordance with the provisions of the Convention relating to the rights of indigenous and other local communities. In contrast to what has previously been assumed, it appears that pastoralists have a less harmful impact on the environment than permanent settlers, and that their lifestyle does not impoverish biological diversity.

NORAD's support schemes for NGOs, both at national and international level, provide funding for many activities that are in accordance with the objectives of the Convention on biological diversity.

It is particularly important to recognize the role of women in natural resource management. In several areas of the SSE countries, for example, women have detailed knowledge of the uses of local seed varieties, and acknowledgement of this can make an important contribution to the conservation of biological diversity. Many projects include the establishment of local women's groups, to improve the position of women who play such an important role in food security.

NORAD supports various IUCN initiatives directly related to the Convention, such as the *Sustainable Use Initiative* and *Biodiversity Conservation Information Systems*. The *Global Biodiversity Forum*, which is the NGO conference held before meetings of the Conference of the Parties, has also received contributions from Norway.

Cooperation between the Norwegian Rainforest Foundation and the inhabitants of the Xingu Indigenous Park in Brazil also illustrates the fact that establishing a reserve is not sufficient to protect biological diversity in an area: the local population must also be ensured an income and opportunities to harvest resources if permanent solutions are to be found.

Box 9 The Xingu Indigenous Park: how to safeguard a protected area

Protection of an area is important, but it is only the first step in a long process. "Protected areas" do not protect themselves. The Norwegian Rainforest Foundation, with support from NORAD's Department for Non-governmental Organizations, has been working in the large Xingu park in the Brazilian state of Mato Grosso since 1993. The area covers 32 000 km^2 and has a population of barely 4 000, split among 17 different ethnic groups.

When the park was established in 1961, it was surrounded by untouched rainforest, and the Indians had minimal contact with the outside world. Since then, however, pioneer towns have grown up all round Xingu, and the reserve is under great pressure from timber companies and cattle ranchers. Deforestation has reached the boundary of the reserve in several places already. In accordance with the Rainforest Foundation's primary strategy, which is to work with local people to preserve forest resources, four long-term projects have been developed which together constitute an integrated approach to the problems in this area.

The "boundary watch" project is directly related to the task of maintaining the area intact. The Foundation's Brazilian partner, ISA, provides updated satellite-based maps showing forestry roads, deforestation and logging operations around the park. The maps and the situation are discussed with the Indians, who are themselves responsible for boundary watch expeditions, maintaining the open strips of land along the park boundary and, not least, contact with the local authorities and business and industry to ensure that the park boundaries are respected.

However, the world has seen many examples of encroachment on such reserves when the needs of the local people are ignored. People are liable to accept short-term solutions if they can see no alternative. The Rainforest Foundation therefore considers the other three projects to be very important. **Marketing of rainforest products** is designed to meet the Indians' modest but growing need for market products through the production and sales of products that do not damage the natural resource base. Sun-dried bananas and honey command good prices and have a large potential. Crafts have brought in some income for many years, while palm oils for the cosmetic and pharmaceutical industry are only at the research stage. The Indians are receiving training in the administration of production, distribution, sales and accounting so that the project can later be continued without outside help.

The **education project** is giving training to young people from all 17 tribes (with 17 different languages) so that they themselves can teach basic reading, writing and arithmetic to their tribes. The project encourages respect for the tribes' own traditions and language, but also provides the knowledge needed to meet the challenges posed by the modern world. The project is developing a teaching model that is culturally sensitive and designed to strengthen the Indians' self-respect and independence. The fourth project in the programme is **technical training** in the maintenance and simple repairs of boats, boat motors, generators, two-way radios and other modern equipment that is occupying an increasingly important place in the Xingu Indians' everyday lives.

The programme, large parts of which may not appear to be directly relevant to biological diversity, gives the local people more control over their own future, and therefore encourages their involvement and participation in sustainable nat. res. man. Despite increasing deforestation and pressure on areas around the reserve, the Xingu reserve is still 100 per cent intact.

Challenges and planned action

NORAD intends to play an active role in following up the topics listed under conservation and sustainable use of biological diversity in the *Strategy for Environment in Development Cooperation* (see earlier). In its dialogue with partner countries, Norway will support their efforts to implement their obligations under the Convention and other relevant international agreements. In particular, Norway will continue its support to parts of Africa that are experiencing drought, and implementation of the Convention on biological diversity and the Convention to combat Desertification will be central elements of this.

NORAD will follow up and support new projects based on the principle of locally-based natural resource management. Support for surveys of biological diversity as a basis for the protection and rational harvesting of resources will be important, both in aquatic and in terrestrial environments. Support for the monitoring and management of fish stocks and other marine resources will continue to play a central role in Norwegian development assistance.

The conservation of genetic diversity in the agricultural sector is also a priority area in the strategy for environment in development cooperation (caps). NORAD views it as an important task to find ways of implementing the Global Plan of Action for plant genetic resources for food and agriculture. From 1998, NORAD will support the FAO and other institutions with a view to reducing the use of pesticides in developing countries. Conservation of plant genetic diversity both in situ and ex situ, must be a central component of this.

We will also support research on biological diversity, particularly research pertaining to the relationship between biodiversity and sustainable production processes.

EXPERIENCE GAINED IN 1993-1997

Norway is giving implementation of the Convention on biological diversity high priority. We have progressed from a situation in which some sectors and groups found the concept of conservation of biological diversity difficult to understand and implement in practice to a stage where these efforts are recognized and the content of the Convention and the work of implementing it have been generally accepted. The Government has taken a leading role in Norway's implementation of the Convention, and the environmental authorities have adapted their policies and activities to give greater emphasis to cross-sectoral responsibilities for the conservation of biological diversity in practice.

This report shows that we have not been able to stop losses of biological diversity since Norway ratified the Convention, but it is clear that long-term efforts to achieve this overriding goal have been considerably intensified. Even though positive results have been achieved in some sectors during the period, steps must be taken to strengthen the overall implementation of the Convention. In some sectors, the focus on issues related to implementation of the Convention on Climate Change have diverted efforts and attention from the implementation of the Convention on biological diversity. In future, it will be important to focus on the interplay between the two conventions.

Report No. 58 (1996-97) to the Storting on an environmental policy for sustainable development will be on the agenda of the Storting in spring 1988. The report is expected to result in stronger requirements for all sectors to integrate considerations of biological diversity into their activities. Following up its recommendations will provide support for the Government's goals and strategy and the organization of the work, in which the coordinating role of the environmental authorities is expected to become even more important. The sectoral plans that were drawn up in 1994 have been very useful in preparing the report to the Storting. Priority will be given to their revision and to the preparation of a national action plan in order to give impetus to the implementation of the Convention. At the same time, coordinated sectoral environmental action plans are being developed, containing requirements for sectors' contributions to a range of environmental issues. Coordination of the plans will be of assistance in our work on biological diversity, and as the sectoral environment plans are further developed, they will incorporate the action plans for biological diversity. In the next few years, the Norwegian environmental authorities intend to give highest priority to the following issues: biological diversity, climate issues and chemicals that are hazardous to health and the environment.

As expected, economic factors have proved to have a major influence on what can be achieved in efforts to conserve biological diversity. The various industries have goals and requirements for cost-effectiveness that can be difficult to reconcile with our objectives for the conservation and sustainable use of biological diversity. At the same time, national and international competitive conditions are of crucial importance in determining to what extent the various sectors are willing to accept additional burdens and efforts related to biological diversity. If there is a conflict of interest, it has frequently been found that the various sectors express understanding, but give losses of biological diversity less weight than short-term economic goals. This is an example of the well-known idea of "the tragedy of the commons".

Although Norway is a wealthy country with a strong economy, there has been agreement among almost all parties during the period covered by this report that growth in the public sector must be reduced to moderate the pressure on the economy. This has clearly limited the results it has been possible to achieve through our efforts to implement the Convention. It is therefore important to develop a cross-sectoral policy in this field that is cost-effective in both ecological and economic terms.

In the period before its next report to the Convention, Norway's policy as regards the use of economic incentives (direct and indirect taxes, grants) to avoid serious disturbance of the environment and non-sustainable use of biological diversity will be reviewed. Eco-labelling and environmental guarantees will be further developed and will become increasingly important factors in marketing. However, such instruments will become much more important competitive factors once national and international measures have been harmonized.

In the period leading up to the UN Conference on environment and development in Rio, it was clear that public interest and involvement in environmental issues was growing, and NGOs were intensifying their efforts. However, since 1993, interest in these issues has been on the wane, and environmental protection is now generally lower on the agenda both in politics and among the general public. There is political recognition that the same has been occurring as regards other issues related to the quality of life and the fundamental values of Norwegian society. This phenomenon appears to be connected with the importance attached to economics and free markets both in Norway and internationally. The Prime Minister has decided to appoint a national commission charged with putting the quality of life and fundamental values back on the agenda. This initiative, together with the emphasis on information, awareness-raising and public involvement in the LA 21 process, may help to regain broader support for environmental issues in a number of sectors and industries. Since the Norwegian population traditionally has close links with nature and sustainable use of its resources in all parts of the country, a focus on awareness-raising has a good chance of success. The same applies to the municipalities' efforts to survey and classify the value of biological diversity. This is to be an open process involving local participation and cooperation with the environmental authorities.

Monitoring, research and available information on biological diversity will be central topics in the continued cooperation between the environmental authorities and other sectors. It is therefore important to further develop systems for research cooperation, monitoring and ensuring that relevant data are available as soon as possible.

In conclusion, Norway has not achieved all the expected results during the period covered by this report, although development trends in a number of fields are satisfactory. We can realistically expect to improve conservation and sustainable use of biological diversity through the involvement of the environmental authorities and other sectors in implementation of the Convention during the period before the next national report to the Convention.